Human Resources Development Canada | Développement des ressources humaines Canada

Occupational Analyses Series

Boilermaker

Canada

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Occupational Analyses Series

Boilermaker

1994

**Occupational Systems
and Standards**

**Systèmes d'information
sur les professions et
normes professionnelles**

**Occupational and Career
Information Branch**

**Direction générale des informations
sur les professions et les carrières**

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OTHER RELATED OCCUPATIONAL TITLES

This analysis covers tasks performed by a boilermaker whose occupational title has been identified by some provinces and territories of Canada under the following names:

Boilermaking (Erection)
Construction Boilermaker

LIST OF PUBLISHED OCCUPATIONAL ANALYSES [*]

Aircraft Gas Turbine Engine Repair and Overhaul Technician (1992)

Aircraft Structural Repair Technician (1992)

Aquaculture Technician (1977)

Arts Administrator (1989)

Automotive Service Technician (1990)

Automotive Technician - Automatic Transmission (1990)

Automotive Technician - Electrical/Electronics (1992)

Automotive Technician - Engine Repair and Fuel Systems (1989)

Automotive Technician - Front-End (1989)

Automotive Technician - Manual Transmission, Driveline and Brakes (1990)

Baker (1991)

Blaster (Surface) (1987)

Boilermaker (1994)

Bricklayer (1993)

Cabinetmaker (1992)

Carpenter (1993)

Cement Finisher (1983)

Construction Electrician (1990)

Cook (1991)

Electrical Mechanic (1981)

Electronics Technician Vol. I (1986)
(Video Equipment)

Electronics Technician Vol. II (1986)
(Audio Equipment)

Electronics Technician Vol. III (1986)
(Computer Equipment)

Electronics Technician Vol. IV (1986)
(Office Equipment)

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[*] **Red Seal analyses are indicated in bold.**

Electronics Technician Vol. VI (1986)
(Communication Equipment)

Electronics Technician Vol. VII (1986)
(Signaling Equipment)

Electronics Technician Vol. VIII (1986)
(Navigation Equipment)

Electronics Technician Vol. IX (1986)
(Video Game Equipment)

Electronics Technician Vol. X (1987)
(CADD Equipment)

Electronics Technician Vol. XI (1987)
(CAM Equipment)

Electronics Technician Vol. XII (1987)
(Robotics Equipment)

Electronics Technician Vol. XIII (1987)
(Biomedical and Laboratory Equipment)

Electronics Technician Vol. XIV (1987)
(Industrial Process-Control Equipment)

Farm Equipment Mechanic (1981)

Floorcovering Installer (1991)

Glazier (1986)

Hairstylist (1992)

Heating (Gas and Oil) Servicer - Commercial and Industrial (1978)

Heavy Equipment Mechanic (1987)

Heavy Equipment Operator (1983)

Industrial Electrician (1987)

Industrial Instrument Mechanic (1988)

Industrial Mechanic (Millwright) (1988)

Insulator (Heat and Frost) (1993)

Ironworker (Generalist) (1993)

Lineman (1988)

Logistics (1992)

Machinist (1992)

Major Electrical Appliance Repairer (1984)

Mobile Crane Operator (1992)

Motor Vehicle Body Repairer (1989)

Motor Vehicle Repairer (Truck and Transport) (1983)

New Home Builder and Residential Renovation Contractor (1992)

Oil and Solid Fuel Heating Mechanic (1986)

Painter and Decorator (1993)

Plumber (1989)

Power Engineer (1986)

Refrigeration and Air-Conditioning Mechanic (1989)

Roofer (1991)

Sheet Metal Worker (1990)

Sprinkler System Installer (1986)

Steamfitter-Pipefitter (1989)

Tool and Die Maker (1992)

Welder (1989)

REQUESTS FOR THESE PUBLICATIONS SHOULD BE FORWARDED TO:

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FOREWORD

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to co-operate with provincial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources Development Canada sponsors a program, under the guidance of the Canadian Council of Directors of Apprenticeship (CCDA), to develop a series of occupational analyses.

The Occupational Analysis Program has the following objectives:

- to identify and group the tasks performed by skilled workers in particular occupations;
- to identify those tasks that are performed by skilled workers in every province and territory;
- to develop instruments for use in the preparation of interprovincial standards "Red Seal" examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility, in Canada, of trainees and skilled workers; and
- to supply employers and employees, and their associations, industries, training institutions and governments with analyses of the tasks performed in particular occupations.

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ANALYSIS

DEVELOPMENT OF ANALYSIS

A draft analysis is developed by a knowledgeable consultant who, with the assistance of a committee of industry experts in the field, identifies all the tasks performed in the occupation.

The draft is then assigned to occupational analysts at Human Resources Development Canada for review, translation and edit to ensure conformity with the nationally approved format.

The analysis is forwarded to provincial/territorial authorities for validation by specialists in the field. Their recommendations are assessed and incorporated into the final draft which also includes the identification of the common core tasks performed in the occupation.

The occupational analysis is published in both official languages.

STRUCTURE OF ANALYSIS

To facilitate the understanding of the nature of the occupation, the work performed is divided into the following divisions:

A. **BLOCK** - is the largest division within the analysis and reflects a distinct operation relevant to the occupation.

B. **TASK** - is the distinct activity that, combined with others, makes up the logical and necessary steps the worker is required to perform to complete a specific assignment within a "BLOCK".

C. **SUB-TASK** - is the smallest division into which it is practical to sub-divide any work activity and, combined with others, fully describes all duties constituting a "TASK".

Enabling Objectives

The element of skill and knowledge that an individual must acquire to perform the task adequately.

Trend

Any shifts or changes in technology that affect the sub-tasks are identified under this heading.

VALIDATION METHOD

At the request of the Canadian Council of Directors of Apprenticeship (CCDA), the Standardization Sub-Committee developed a method for the validation of the national Red Seal occupational analyses.

A draft of the analysis is sent to all provinces/territories for validation. Each jurisdiction rates the sub-tasks and applies percentage ratings to blocks and tasks. This method for the validation of the national occupational analyses identifies common core tasks across Canada for a specific occupation. This feature facilitates the weighting of the Interprovincial Red Seal examinations.

DEFINITIONS

YES:	the sub-task is performed.
NO:	the sub-task is not performed.
BLOCK %:	the average time a worker spends performing each block in a given year in relation to other blocks of the analysis, taking into consideration the complexity (importance plus difficulty) of the block. (See Appendices "C" and "D" for numerical and graphical representations of this specific occupation.)
TASK %:	the average time a worker spends performing each task in relation to other tasks within the block, taking into consideration the complexity (importance plus difficulty) of the task. (See Appendix "C" for numerical representation of this specific occupation.)
NV:	Not Validated by the province/territory.
ND:	Not Designated in that province/territory.

COMMON CORE

The criteria for determining common core are dependant on the performance of sub-tasks. If 70% of the responding jurisdictions (excluding NVs and NDs) perform the sub-task, it shall be considered common core.

In the analysis, Block A is reserved for safety practices. Since safety practices are a mandatory feature of all occupations, it is considered common core and ratings are not required.

Interprovincial Red Seal examinations are based on the common core identified through this validation process.

SCOPE OF ANALYSIS

A journeyperson boilermaker is a tradesperson who must possess the full range of knowledge, abilities and skills required to fabricate, construct, install, assemble, erect, demolish, repair and maintain an extremely wide variety of vessels, tanks, towers, hoists and other structures, ancillary equipment and fixtures made of steel, iron, fibreglass, and other metals and materials.

The broad scope of the boilermaker trade is reflected in the collective agreements between the unions concerned and the employers and it includes the construction and maintenance work activities performed in the field and in industrial and commercial plants, such as:

> Power plants, cement plants, fertilizer plants, water treatment facilities, breweries, sawmills, iron and steel production facilities, steam generation plants, power generation (thermal, nuclear, hydro, gas turbines, refineries (oil, chemical), ship repair, pulp and paper and many other industries and businesses.

The work activities performed by boilermakers may, in some instances, overlap with those performed by other tradespersons, such as:

> Fitters, pipefitters, layout persons, steel fabricators, riggers, ironworkers, welders, etc.

OBSERVATIONS AND TRENDS ARISING FROM ANALYSIS

The trade of the boilermaker has progressed considerably in many areas, such as implementation of the Red Seal program, including standardized interprovincial examinations. Of important note, too, is the fact that more women are becoming tradespersons in this area.

Trade training curricula are continually being updated and modified to meet the demands of changing technology and new materials.

A certain amount of overlap exists between trade tasks performed by boilermakers and other tradespersons, such as fitters, pipefitters, layout persons, steel fabricators, ironworkers, riggers, welders, etc. In addition, trade regulations, which vary from province to province or from province to territory, affect the extent of work which may be performed by various tradespersons. These "jurisdictional" matters are normally noted and defined by agreement between the unions concerned and the employers. Insofar as this analysis is concerned, an attempt has been made to include tasks performed by boilermakers anywhere in Canada, regardless of isolated cases of overlaps and/or restrictions.

Joint union/management-operated training schools for boilermakers and related tradespersons have emerged as a result of shortages of skilled help and as a means for updating qualified workers. These schools seem to operate economically and efficiently and provide a service to participating firms by filling staff shortages with qualified people and upgrading the qualifications and knowledge of union members. These schools may provide upgrading and specialized welding courses for selected workers on an assignment basis during working hours and on a voluntary basis for interested workers on an after-working hours basis.

Whether these joint efforts are destined to become a standard means of delivering training is not known. Such projects, however, serve to fill many needs for the employers and the workers, particularly where there is a large project employing thousands of workers in a more or less isolated location. Boilermaker locals may also operate on-site schools for upgrading their members.

Considerable specialization occurs in this trade. Most workers specialize in certain phases of construction, particularly in the rigging and hoisting field, some specialize in layout or preparation activities, while others prefer to specialize in the welding portion of the trade, requiring a high level of qualification. It seems that this type of specialization occurs because of the specialized production processes used by most firms. Other considerations may be more personal. Some workers prefer to work close to home and family and will accept lower, regular wages and hours rather than work on more isolated construction projects. For some workers the economic benefits and the availability of work outweigh the other considerations and they select the working and living conditions associated with large construction projects in isolated locations.

Technology has contributed to many changes in field construction. Most obvious are the following: larger and heavier sections being shipped from fabricators, more use of alloy materials, increased use of fibreglass, larger cranes for hoisting materials and sophisticated welding techniques.

A fact worth noting is the increased size and complexity of the plants being constructed in somewhat remote areas. Vessels and other structures erected in the field may include storage tanks 90 metres in diameter and over 30 metres high; boilers with steam drums weighing 150 tons that are hoisted and suspended 60 metres from the floor of the building as well as prefabricated towers and chemical processing units over 6 metres in diameter and 60 metres high which are transported to, and erected, in the field. All of these require new and constantly-changing methods, techniques and equipment for their rigging, hoisting and erection. Keeping abreast of these changes presents an ongoing challenge to members of this trade.

The boilermaker has a major role in the field assembly of components for nuclear power plants, as well as in sophisticated welding techniques, quality control, rigging, transporting and placing of cumbersome components.

In order to perform effectively in the construction or maintenance of complex facilities, a boilermaker must possess and use considerable strength and agility, and must have the ability to work at extreme heights and confined spaces in all types of weather and working conditions.

This section would not be complete without mention of the fact that the work of a boilermaker, by its very nature, is extremely hazardous. Errors in judgement or in practical application of trade knowledge can be extremely costly, both in terms of injury to workers and damage to equipment or materials. Constant, vigilant attention to the application of safety and accident prevention knowledge must be maintained by workers at all times.

The boilermaker is continually required to train for safety in the work place due to the possibility of exposure to hazardous materials and gases that could create health problems.

ANALYSIS

BLOCK A SAFETY, ACCIDENT PREVENTION AND FIRST AID

Task 1 Follows safety laws and regulations.

Trend: More stringent laws, especially with regard to materials handling and first aid, means increased awareness of safety.

	Sub-tasks	Enabling Objectives	Tools & Equipment
1.01	Obtains relevant laws and regulations.	knowledge of sources necessary to obtain information ability to read, understand and interpret information, such as Canadian Standards Association (CSA), Workers' Compensation Board (WCB), Workplace Hazardous Materials Information System (WHMIS) and collective agreements	
1.02	Reports accidents.	knowledge of appropriate authorities to contact ability to write, give oral reports and record information in log books	

Task 2 Selects personal protective equipment.

Trend: There is more interest in personal safety, especially with the advent of more hazardous waste clean-up operations and more stringent standards.

	Sub-tasks	Enabling Objectives	Tools & Equipment
2.01	Obtains information regarding site safety requirements.	knowledge of where to obtain related information	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of hazards associated with flammable liquids, gases, dusts, static electricity, oxygen, acids, alkalies, solvents and cleaning agents	
		ability to read, understand and interpret information	
2.02	Obtains personal protective equipment.	knowledge of whether the equipment is supplied on site, to be rented or to be supplied by the worker	
		knowledge of goggles, face shields, hard hats, gloves, safety boots and personal protective creams	

Task 3 **Applies safe work practices.**

Trend: Workers display more awareness and place more emphasis on safe work practices.

	Sub-tasks	Enabling Objectives	Tools & Equipment
3.01	Identifies hazards and unsafe work practices.	knowledge of unsafe conditions and practices	
		knowledge of laws and regulations	
		knowledge of manufacturing processes, work sites, plants, etc.	
		knowledge of proper electric connections and sparkproof tools	
		knowledge of hazards related to compressed air, oxy-acetylene, propane, etc.	

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of safe practices when working at heights	
	knowledge of proper tool use	
	ability to apply training, experience and common sense, such as listens, watches and smells while working	
	ability to maintain clear exits at all times	
	ability to recognize and remove or replace defective tools	
3.02 Offers suggestions concerning safety.	knowledge of unsafe conditions and practices	
	knowledge of manufacturing processes, work sites, plants, etc.	
	ability to apply training, experience and common sense, such as listens, watches and smells while working	
3.03 Reports all hazards and unsafe work practices.	knowledge of proper authorities to contact	
	knowledge of tools and equipment	
	ability to communicate orally and in writing	
3.04 Operates equipment safely.	knowledge of manufacturers' recommended specifications, laws and regulations, site conditions and policies and company policies	
	ability to govern personal conduct responsibly with regard to drugs, alcohol, stress, rest and so on	
3.05 Takes part in safety training and meetings.	knowledge of policies concerning safety meetings	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to observe, listen and express ideas	
3.06	Works in confined spaces.	knowledge of procedures for entering hazardous areas	lock-out tags
		knowledge of how to obtain approval to enter hazardous areas	
		knowledge of ventilation, testing procedures and importance of standby person	
		knowledge of the use of lifelines and safety harness	
		ability to manoeuvre and operate tools in difficult situations	
		ability to install fans and ductwork for ventilation	
3.07	Applies safe lifting techniques.	knowledge of body mechanics and proper body position when making manual lifts	
3.08	Obtains first aid training.	knowledge of where to get training	
		ability to apply techniques, such as artificial respiration, treatment for shock, control of bleeding, treatment for broken bones and eye injuries	

Task 4 **Heeds safety and warning systems.**

Trend: More sophisticated, standardized and critically important systems are being introduced.

	Sub-tasks	Enabling Objectives	Tools & Equipment
4.01	Heeds warning signs, tags and lock-out procedures.	knowledge of various warning systems knowledge of procedures and policies for installation and removal of warning systems knowledge of various site conditions and systems ability to gather procedural information from meetings, video, audio and written material ability to install warning signs or systems ability to monitor warning signs or systems	video, audio and written material, warning tags, lock-out devices, signs

Task 5 **Selects and operates fire fighting equipment.**

Trend: There is an ongoing introduction of new fire fighting equipment and techniques, e.g. class D fire extinguishers.

	Sub-tasks	Enabling Objectives	Tools & Equipment
5.01	Takes fire fighting training.	ability to comprehend and communicate ability to physically manipulate a wide variety of extinguishers and equipment	flares, fire extinguishers, fireproof blankets, respirators, masks, fire hoses, sprinkler systems
5.02	Inspects fire fighting equipment.	knowledge of fire fighting equipment knowledge of fire fighting techniques	flares, fire extinguishers, fireproof blankets, respirators, masks, fire hoses, sprinkler systems

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of location of fire fighting equipment	

Task 6 **Performs housekeeping procedures.**

Trend: More awareness of personal safety on the part of employers and workers encourages individuals to create a safe, neat working environment.

	Sub-tasks	Enabling Objectives	Tools & Equipment
6.01	Maintains a safe work area.	knowledge of safe clean-up procedures and disposal of waste material	shovel, broom, masks, eye protection
		ability to lift, carry, sweep and shovel	
		ability to read, understand and interpret information, such as CSA, WCB, WHMIS and collective agreements	

BLOCK B JOB PLANNING AND PREPARATION

Task 7 **Reads drawings and specifications.**

Trend: A greater use of computer information technology is used in job planning and preparation.

	Sub-tasks	Enabling Objectives	Tools & Equipment
7.01	Checks drawings for job assigned.	knowledge of drawings, identification of drawing principles and types, relationship of drawings to each other and how each is used knowledge of vessel types and their purposes knowledge of the purpose of component parts ability to read and interpret drawings	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
7.02	Interprets drawings.	knowledge of abbreviations, symbols, reference points and terminology ability to read and interpret drawings	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
7.03	Relates drawings and specifications to work site.	knowledge of shop mathematics knowledge of scales and measuring techniques ability to interpolate according to scale to determine orientation of component parts in or on completed unit	scale rule, calculator

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to make fast, accurate calculations	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

7.04	Draws sketches.	ability to read and interpret drawings ability to make rough drawings and sketches	pencil, paper, drafting equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

7.05	Consults with supervisor or technical expert.	knowledge of the importance of technical operations knowledge of appropriate persons to consult	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 8 **Plans the job for removal, maintenance and/or repair.**

Trend: A greater use of computer information technology is used in job planning and preparation.

	Sub-tasks	Enabling Objectives	Tools & Equipment
8.01	Inspects job site.	knowledge of regulations and policies knowledge of appropriate work techniques and processes ability to recognize conditions and situations that may be useful or detrimental to completion of the work	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
8.02	Selects appropriate methods.	knowledge of regulations and policies knowledge of appropriate work techniques and processes knowledge of repair and maintenance procedures knowledge of the construction and erection requirements for a wide variety of vessels, structures and related equipment ability to apply organizational skills	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
8.03	Selects appropriate materials.	knowledge of regulations, specifications and policies knowledge of materials	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to apply organizational skills	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

8.04	Adheres to environmental regulations.	knowledge of regulations and policies knowledge of appropriate work techniques and processes knowledge of materials	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

8.05	Acquires appropriate tools and equipment.	knowledge of appropriate work techniques and processes knowledge of tools knowledge of materials knowledge of where to obtain tools and equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

8.06	Establishes tool crib(s) at laydown yard and work site.	knowledge of use, purpose and organization of tool and equipment storage sites (tool cribs) knowledge of moving small buildings onto temporary sites	crane, slings, shackles, hand lines, hammer, pry bar, hand wrenches, rigging belts, knives, measuring tape, ladders, welding equipment, oxy-

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of tool storage requirements	acetylene cutting equipment
		ability to organize and document substantial quantities of different types of equipment	
		ability to level and set up small buildings	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

8.07	Obtains proper safety equipment.	knowledge of regulations and policies	
		knowledge of appropriate work techniques and processes	
		knowledge of materials	
		knowledge of where to obtain equipment	
		knowledge of lock-out and safe entry procedure at an existing plant	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

8.08	Ensures quality and productivity.	knowledge of regulations, specifications and policies	drawings, specifications, paper, pencil
		knowledge of appropriate work techniques and processes	
		knowledge of materials and specifications	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of managerial techniques ability to inspect materials and fabrications for quality ability to use interpersonal skills ability to communicate orally and in writing ability to recognize conditions and situations that may be useful or detrimental to completion of the work ability to apply organizational skills	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
8.09	Inspects materials.	knowledge of applicable material specifications ability to read and interpret drawings ability to match specifications and quality standards	drawings, specifications and tables, paper, pencil

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
8.10	Stores materials and parts for sequential use.	knowledge of operations sequence or schedule knowledge of appropriate organization of materials	rigging/hoisting equipment, dunnage, labelling materials, paints, markers, Material Safety Data Sheets (MSDS)

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of storage requirements for various materials	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

Task 9 **Practises good communication skills.**

Trend: Towards better lines of communication and increased involvement of the tradesperson in this process.

	Sub-tasks	Enabling Objectives	Tools & Equipment
9.01	Demonstrates professional behaviour.	knowledge of subtrades and schedules	
		ability to interpret drawings and written instructions	
		ability to communicate orally and in writing	
		knowledge of importance to be punctual, tactful, honest and reliable	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

9.02	Arranges schedules with other trades.	knowledge of general type of work to be done	calendars, day books, logs
		knowledge of subtrades and schedules	
		knowledge of contract requirements	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to interpret drawings and written instructions ability to communicate orally and in writing knowledge of importance to be punctual, tactful, honest and reliable ability to find out exactly what must be done and how it is to be done	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
9.03	Requests additional workforce.	knowledge of work to be done knowledge of appropriate persons to contact knowledge of regulations and policies knowledge of supplies and materials ability to communicate orally and in writing knowledge of appropriate work techniques and processes ability to access previous knowledge of expediting tasks	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
9.04	Assigns subordinate and associate workers to tasks.	knowledge of general type of work to be done	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of subtrades and schedules knowledge of contract needs ability to assess skills ability to interpret drawings and written instructions ability to communicate orally and in writing ability to establish and maintain effective working relationships with superiors, subordinates and associate workers ability to govern self and others with regard to punctuality, tact, honesty and reliability ability to find out exactly what must be done and how it is to be done	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

9.05	Lists and orders materials required for the job.	knowledge of specifications and materials knowledge of procedures to follow to obtain materials knowledge of material take-off procedures, orally and in writing knowledge of specification codes and identification of standards of steel, piping fixtures, fittings and related equipment	reference code books, tables, manuals, pencil, paper

ability to communicate

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

9.06 Co-operates with other trades.

knowledge of general type of work to be done

knowledge of subtrades and schedules

knowledge of contract needs

ability to interpret drawings and written instructions

ability to communicate orally and in writing

ability to govern self with regard to punctuality, tact, honesty and reliability

ability to find out exactly what must be done and how it is to be done

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

9.07 Conducts meetings.

knowledge of group communication skills

ability to communicate orally

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
9.08	Settles disputes.	knowledge of and ability to apply oral and interpersonal skills knowledge of dispute issues knowledge of regulations, laws and agreements ability to negotiate tactfully and fairly ability to communicate orally	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
9.09	Keeps records of materials used.	knowledge of simple record keeping systems knowledge of suppliers, quantities, dates, job numbers, year and batch numbers and other pertinent information related to materials	steel letter and number stamps, pencil, paper, paint markers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

BLOCK C FABRICATION, REPAIR/MAINTENANCE, ASSEMBLY/DISASSEMBLY AND DEMOLITION OF COMPONENTS AND STRUCTURES

Task 10 Operates gas cutting equipment.

Trend: Towards technology changes in cutting equipment due to increased use of alloy materials.

	Sub-tasks	Enabling Objectives	Tools & Equipment
10.01	Interprets drawings and specifications.	knowledge of American Welding Society (AWS) standard welding symbols knowledge of pertinent safety regulations knowledge of gas cutting methods ability to read and interpret drawings and specifications	drawings, specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

10.02	Selects and obtains proper equipment.	knowledge of all types of oxy-acetylene, propane, map gas and plasma equipment knowledge of type of work to be done knowledge of material to be cut knowledge of where to obtain proper equipment	gas cutting equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

10.03	Sets up equipment.	knowledge of function and purpose of caps, regulators, hoses, torches, sequence of assembly, importance of "cracking" oxygen cylinder valves before attaching regulators and hoses knowledge of correct method of attaching regulators and hoses	gas cutting equipment, wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of procedures for purging unit hoses and interior of torch ability to lift and assemble cutting equipment ability to follow procedures for connecting hose to torch and inserting tip into torch head	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

10.04	Selects cutting torch.	knowledge of types of torches and their characteristics, such as air arc, oxy-acetylene, air and arc knowledge of importance of correct nozzle size in relation to thickness of steel to be cut knowledge of cutting tips ability to determine proper oxygen pressure for the cutting of different materials	cutting torches, tips

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

10.05	Operates cutting equipment.	knowledge of safety regulations and practices in plants that are in operation knowledge of material characteristics knowledge of equipment	gas cutting equipment, helmet, goggles, gauntlets, boots, leather cape, apron, shields, tip cleaners

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to recognize and compensate for adverse conditions, such as improper flame, improper cutting speed, improper oxidization, backfire and flashback ability to start and adjust torch for desired working pressure ability to maintain proper pressure ability to hold torch for various cutting techniques	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

10.06	Dismantles cutting equipment.	knowledge of cleaning methods for tips and nozzles knowledge of handling and storing of cylinders ability to lift and store equipment	wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 11 **Welds metal.**

Trend: Welding equipment has become less cumbersome due to technological change.

Note: The minimum standards used to which welding is permitted is dependent on provincial/territorial regulations.

	Sub-tasks	Enabling Objectives	Tools & Equipment
11.01	Interprets drawings and specifications.	knowledge of standard welding definitions and AWS standard welding symbols knowledge of structural shapes knowledge of types, purposes and characteristics of welding electrodes knowledge of storage requirements for welding electrodes ability to visually identify each type of welding electrode	drawings, specifications, code books

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

11.02	Selects and sets up welding equipment.	knowledge of types of equipment for: arc spot welding arc seam welding, submerged arc welding, stud welding, electroslag welding, heliarc: flux cored wire, gas metal-arc welding (GMAW), etc. knowledge of types, operation and use of arc welding machines: gasoline, diesel, electrical (SCW machine, AC-DC rectifiers, AC transformers and inverters) knowledge of standards for electric arc welding machines knowledge of procedures for servicing and maintenance of welding machines knowledge of proper connection of ground-line electric machines to power source types	appropriate welding equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of welding cables and grounding considerations	
		knowledge of welding current versus cable size and length	
		ability to diagnose and remedy common arc welding machine troubles	
		ability to set up equipment and connect cables to holder and machines	
		ability to splice welding cables	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

11.03	Welds required joints.	knowledge of the safety precautions to observe before, during and after welding operation especially in confined areas, refineries, chemical plants, congested areas or on vessels that have contained flammable materials or explosive dusts	welding equipment, hammer, pneumatic tools, ball-peen hammer, chipping hammer, power brush, power grinder, personal protective equipment, helmet, goggles, boots, leather cape, apron
		knowledge of fundamentals of manual and semi-automatic arc welding of carbon and alloy steel welding sequence	
		knowledge of the effect of joint design, rate of deposition and types of electrodes	
		knowledge of terminology and identification of plate and structural shapes, elements of members and symbols	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of types, purpose and use of various plate and structural joints and connections, such as butt, fillet, lap, edge and plug welds	
		knowledge of layout procedures for connecting pipes and other shapes to cylindrical, spherical and ellipsoidal vessels, perpendicular to and angular to the shells of vessels	
		knowledge of the effects of magnetic fields (natural or electric), temperature and moisture on welds, purpose and technique for preheating, post-heating and stress relieving, and methods of controlling distortion during welding	
		knowledge of proper fitting and aligning, effects and causes of porosity	
		knowledge of the importance of surface preparation for welding, as well as effects and causes of over welding	
		ability to weld from a number of positions, such as overhead, vertical, etc.	
		ability to use small hand and power tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

11.04	Maintains electric arc or electroslag welding machines.	knowledge of types, operation and use of arc welding machines, such as gasoline, diesel, electrical (SCW	MIG, TIG, arc, electroslag and other types of welding

Sub-tasks	Enabling Objectives	Tools & Equipment
	machine, AC-DC rectifiers, AC transformers and inverters) knowledge of standards for electric arc welding machines knowledge of procedures for servicing and maintenance of welding machines knowledge of types, purposes and characteristics of welding electrodes ability to diagnose and remedy common arc welding machine troubles ability to identify visually each type of welding electrode	equipment, rags, cleaning agents, socket wrenches, screwdrivers, adjustable wrenches, callipers, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	no	yes	yes	ND	ND

Task 12 Prepares plate steel for fabrication of steel vessels.

Trend: Towards the use of more technologically advanced equipment.

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.01	Selects appropriate lifting and moving equipment.	knowledge of job sequence knowledge of lifting and moving equipment knowledge of job requirements	lifting and moving equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.02	Attaches rigging equipment to materials.	knowledge of rigging and hoisting equipment, techniques and practices ability to attach a variety of equipment	fork lift, boom truck, crane, slings, chokers, spreader bars, special lifting devices, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

12.03	Moves material to desired location.	knowledge of hoisting signals and appropriate safety rules and regulations ability to give appropriate signals	rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

12.04	Dismantles and stores rigging equipment.	knowledge and experience in safe removal and storage of rigging equipment ability to dismantle equipment ability to lift and carry	wrenches, pallets

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

12.05	Measures and marks steel for cutting to specifications.	knowledge of measuring and squaring methods ability to read and interpret drawings ability to use material economically	measuring tape, square, compass, templates, callipers, clamps, chalk or paint, hammer, centre punch, trammel points and others

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to identify correct material	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.06	Operates semi-automatic oxy-acetylene or natural gas cutting machine.	knowledge of cutting capacity required for various types and thicknesses of steel plate knowledge of gas cutting principles ability to adjust, control and maintain cutting machines ability to follow manufacturers' recommendations	semi-automatic cutting machine, guide rails, clamps, manifolds, special cutting tips, tip conditioning kit, manuals and directions

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.07	Sets up and operates metalworking machines.	knowledge of operation of metalworking machines, such as shears, saws and brake presses knowledge of mounting, power, access and other details of each type of machine ability to follow manufacturers' recommendations ability to lift and carry ability to give signals	metalworking machines, lifting devices, wrenches, screwdrivers, measuring tape, callipers, spirit level, manuals

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.08	Examines and measures cut material.	knowledge of applicable specification knowledge of suitable measuring devices ability to measure ability to read and interpret drawings	measuring tape, bevel gauge, specifications, drawings

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.09	Cleans and smooths cut edges.	knowledge of use of power and hand equipment ability to ensure proper preparation for subsequent operations	power grinder, hammer, chipping tools, personal protective equipment, safety glasses or face shield, gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
12.10	Removes or directs removal of waste material.	knowledge of good housekeeping practices and economy ability to transport waste to appropriate scrap bins	scrap bins, broom, shovel, wheelbarrow, lifting devices, gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 13 **Lays out circular shell for internals and appurtenances.**

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.01	Studies drawings and specifications.	knowledge of function and construction of a wide variety of vessels ability to identify type and purpose of vessel to be fabricated ability to read drawings and interpret signs and symbols	paper, pencil, specifications, drawings

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.02	Positions and adjusts manual or power operated rotators.	knowledge of adjusting rotators to suit shell ability to accommodate size and nature of shell	rotators, wrenches, turning tool, wedges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.03	Directs positioning of shell on rotators.	knowledge of hoisting signals knowledge of requirements of the job ability to communicate orally or by using signals	overhead crane, lifting devices, rigging hardware

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.04	Rotates shell on rotators to ensure correct side is up.	knowledge of standard procedure for identifying shells and component parts	manual or power rollers

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate rollers	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.05	Marks identifying code number on shell.	knowledge of job at hand ability to read and interpret drawings ability to operate hand tools	steel stamps, paint markers, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.06	Selects end for tangent or reference line.	knowledge of match marks knowledge of staggering seams ability to operate hand tools	hammer, centre punch, paint markers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.07	Marks centre top on both ends of shell.	knowledge of identification codes ability to locate centre of shell ability to operate hand tools	centre finder, centre punch, hammer, chalk, paint

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.08	Snaps line on top centre.	ability to use snap line	snap/chalk line

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.09	Divides circumference of each end into four quadrants.	knowledge of basic mathematical operations ability to compute ability to measure	steel measuring tape, compass, dividers, templates, clamps

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.10	Centre punches each end.	ability to use paint marker ability to centre punch marks	centre punch, paint markers, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.11	Snaps line to mark each quadrant.	ability to use snap line	snap/chalk line

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.12	Locates and marks starting point for measurements.	knowledge of job at hand ability to read and interpret drawings	snap/chalk line, measuring tape

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.13	Centre punches location of each fixture.	knowledge of techniques of drawing various shapes and sizes of openings on circular surfaces ability to rotate shell as required ability to refer to drawings ability to measure ability to operate hand tools	measuring tape, hammer, centre punch, soapstone, chalk, paint markers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.14	Prick punches around openings to retain marks.	knowledge of code symbols for identifying fixtures, such as nozzles, couplings, manholes, etc. ability to operate hand tools	hammer, prick punch

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

13.15	Directs movement of shell to another work location.	knowledge of rigging procedures and precautions to take	crane, rigging hardware, slings, wrenches, spreader bars, shackles

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
13.16	Gives directions to burners and drill operators.	knowledge of sequence of events knowledge of materials knowledge of job at hand ability to give clear instructions for placement of nozzle, manways and tapped holes	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

Task 14 Assembles/disassembles, repairs and maintains tanks, hoppers and similar vessels.

Trend: More alloy materials.

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.01	Interprets drawings and specifications for tank construction.	knowledge of code requirements knowledge of AWS standard welding symbols knowledge of pertinent safety regulations knowledge of gas cutting methods ability to read and interpret drawings and specifications	drawings, specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.02	Examines vessel base.	knowledge of corrosion effect on	transit, level, metric or

	Sub-tasks	Enabling Objectives	Tools & Equipment
		metal objects on bottoms of tank ability to check that base is level and clear of all metal objects	imperial rod

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.03	Selects appropriate hoisting and rigging equipment.	knowledge of capabilities of different types of hoisting equipment knowledge of job sequence knowledge of job requirements	crane, boom truck, slings, chokers, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.04	Determines centre of tank and strings centre lines.	knowledge of methods for determining centre point and for laying out centre lines	measuring tape, pencil, soapstone, transit, string

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.05	Directs movement of first floor plate into position.	knowledge of layout techniques ability to read and interpret drawings knowledge of rigging and hoisting equipment, techniques and practices knowledge of signals	crane, clamps, rigging hardware

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to attach a variety of equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.06	Divides and marks ends and sides of plate.	knowledge of layout techniques ability to read and interpret drawings knowledge of methods of finding centres ability to compute ability to use chalk line	measuring tape, chalk line, soapstone, pencil

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.07	Positions plate marks under centre lines.	knowledge of layout techniques ability to read and interpret drawings ability to lift and carry ability to use hand tools	dolly bars, funny bars

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.08	Welds centre pin at intersection of centre lines.	knowledge of welding techniques	welding equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate welding equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.09	Tack welds plates in succession.	knowledge of job requirements and specifications knowledge of techniques used in laying lap and butt-type floors knowledge of welding methods and tolerances knowledge of applicable codes: American Petroleum Institute (API), American Society of Mechanical Engineers (ASME), American Water Works Association (AWWA) and National Building Code knowledge of provincial/territorial welding regulations ability to position and align plates ability to tack weld	welding equipment, finger bars, shims, wedges, backing-up bars, funny bars, joggle plates, nuts, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.10	Lays out inside radius for first ring of shell.	knowledge of layout techniques knowledge of techniques for dividing circle into equal parts ability to read and interpret drawings	soapstone, chalk, measuring tape

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to compute ability to use chalk line ability to measure	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.11	Marks location of first shell joint on circle.	knowledge of layout techniques ability to measure	soapstone, chalk, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.12	Divides and marks circle into equal sections.	knowledge of layout techniques ability to measure	soapstone, chalk, measuring tape, trammel points

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.13	Welds nuts around outside edge.	knowledge of standard vessel construction techniques knowledge of appropriate spacing and positioning of nuts relative to joints ability to fit and weld nuts	welding equipment, measuring tape, nuts

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.14	Welds key plate nuts on each end of plates.	knowledge of standard vessel shell construction methods knowledge of appropriate spacing and positioning of nuts relative to joints ability to fit and weld nuts	key plates, fitting wedges, key plate lugs, shims, level, hammer, bull pins, finger bars, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.15	Welds scaffold clips.	knowledge of rigging and lifting methods ability to fit and weld clips	measuring tape, welding equipment, clips

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	no	yes	ND	ND

14.16	Directs placement of first shell plate.	knowledge of layout techniques knowledge of rigging and hoisting equipment, techniques and practices ability to read and interpret drawings ability to attach a variety of equipment ability to give signals ability to align plate exactly with first point on scribed circle	crane, boom truck, slings, chokers, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.17	Tack welds end of plate to floor.	knowledge of welding methods and tolerances knowledge of provincial/territorial welding regulations ability to position and align plates ability to tack weld	hammer, bull pins, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.18	Aligns plate with scribed circle and next plate mark.	knowledge of standard vessel construction techniques ability to force plate out to scribed circle using prewelded nuts ability to ensure that the plate has a smooth curve ability to position and align plates	wrenches, bolts

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.19	Levels, plumbs and tack welds plate.	knowledge of standard vessel construction techniques ability to use spirit level ability to position plates ability to tack weld	spirit level, builder's level, transit, welding equipment, wedges, bars

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.20	Hoists, places and aligns second shell plate.	knowledge of standard vessel construction techniques ability to give signals ability to position and align plates	crane, boom truck, slings, chokers, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.21	Attaches aligning devices.	knowledge of standard vessel shell construction methods knowledge of appropriate spacing and positioning of aligning devices ability to fit and weld	welding equipment, key plates, fitting wedges, shims

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.22	Installs all first course plates.	knowledge of standard vessel shell construction methods knowledge of fitting techniques and sequences ability to read and interpret drawings ability to give signals ability to align plates ability to weld	welding equipment, crane, boom truck, slings, chokers, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.23	Erects scaffold brackets and planks.	knowledge of scaffold erecting methods and techniques knowledge of safety precautions and regulations regarding scaffolding ability to measure ability to lift and carry ability to weld	brackets, planks, safety posts, safety guard rail, welding equipment, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.24	Lays out for succeeding plate rings.	knowledge of standard vessel shell construction methods knowledge of fitting techniques and sequences knowledge of specifications for gapping and staggering joints of succeeding rings ability to read and interpret drawings ability to measure	measuring tape, hammer, chalk, centre punch, gapping tool, car spring, shims, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.25	Welds finger bars to permit alignment.	knowledge of standard vessel shell construction methods knowledge of fitting techniques and sequences	measuring tape, hammer, chalk, centre punch, gapping tool, car spring, shims, welding equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of specifications for gapping and staggering joints of succeeding rings ability to measure ability to weld	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.26	Directs hoisting of rim angle into position.	knowledge of installation techniques for top angles ability to attach rigging devices ability to give signals	rim angle components, crane, rigging equipment, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.27	Installs rim angle sections using shims and wedges.	knowledge of installation techniques for top angles knowledge of standard vessel construction techniques ability to give signals ability to level and align components ability to weld	shims, wedges, welding equipment, spirit level, transit

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.28	Assembles and lays out structural support material for roof.	knowledge of sequence of work ability to read and interpret drawings and specifications ability to lift and carry	structural support material, drawings, specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.29	Prepares job site for use of hoisting equipment.	knowledge of persons to notify in order to make appropriate changes to site ability to move obstructions or bring material to site	shovel, forklift, trucks

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.30	Selects appropriate hoisting equipment.	knowledge of hoisting equipment knowledge of rigging equipment	crane, derrick, tugger, jacks, chokers, slings, spreader bars, wrenches, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.31	Assigns duties to boilermaker crew.	knowledge of construction methods for structural steel knowledge of potential hazards to workers and material	wrenches, drift pins, hammer, wire rope cable, turnbuckles, shims, jacks, plumb bob, survey instruments

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of general type of work to be done	
	knowledge of subtrades and schedules	
	knowledge of contract needs	
	ability to assess skills and assign tasks to workers, such as signallers, ground riggers, hoisting operators and connectors	
	ability to read and interpret drawings, specifications and written instructions	
	ability to communicate orally and in writing	
	ability to establish and maintain effective working relationships with superiors, subordinates and associate workers	
	ability to govern self and others with regard to punctuality, tact, honesty and reliability	
	ability to find out exactly what must be done and how it is to be done	
	ability to use appropriate nomenclature	
	ability to communicate methods of plumbing columns, bolting and torquing	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.32	Directs sequential rigging and hoisting of support structures.	knowledge of methods and procedures for rigging and hoisting ability to give signals	wire rope slings, chokers, crane, derrick, tugger, jacks, spreader bars, wrenches, special rigging devices, spreaders or other rigging apparatus

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.33	Installs roof structure and rafters.	knowledge of installation techniques for vessel roofs knowledge of standard vessel construction techniques ability to give signals ability to level and align components	roof structure components, rafters, shims, wedges, welding equipment, spirit level, transit

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.34	Corrects shell roundness and fits roof rafters.	knowledge of methods and techniques for rounding up shells and fitting rafters ability to jack up shell ability to remove grade material	jacks, blocking devices, excavation equipment, shovel, wheelbarrow, level, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.35	Welds rafter ends to rim angles.	knowledge of installation techniques for rafters to top angles knowledge of standard vessel construction techniques ability to give signals ability to level and align components ability to weld	welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.36	Directs rigging and hoisting of roof.	knowledge of methods and procedures for rigging and hoisting ability to give signals	crane, derrick, tugger, jacks, chokers, slings, spreader bars, wrenches, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

14.37	Positions and fastens roof plates to rafters.	knowledge of standard vessel construction techniques ability to give signals ability to align components ability to weld ability to install a variety of roof types such as floating roofs, in accordance with specifications	shims, level, hammer, bull pins, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.38	Prepares tank for inspection and assists in testing.	knowledge of testing and inspection methods and techniques knowledge of ASME and other standards	air pressure or vacuum equipment, soap suds, linseed oil, penetrating oil, water, hoses

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
14.39	Removes tank components.	knowledge of welding techniques knowledge of standard vessel shell construction methods knowledge of potential hazards to workers and material knowledge of subtrades and schedules knowledge of safety requirements knowledge of non-destructive testing prior to repair knowledge of hoisting and rigging methods knowledge of blinding and blanking procedures knowledge of confined space entry procedures knowledge of techniques for removal and maintenance of tank components ability to read and interpret drawings, specifications and procedures manuals	crane and lifting equipment, burning and cutting equipment, hand tools, impact wrenches, common arc gouger, scaffolding, gas testing equipment, air tools, drawings, specifications, boom truck, side booms, slings, chokers, special rigging devices, pencil, soapstone, clamps and rigging hardware, dolly bars, welding equipment, finger bars, shims, wedges, backing-up bars, joggle plates, nuts, hammer, trammel points, key plates, bull pins, wrenches, bolts, spirit level, builders' level, scaffold brackets, planks, safety posts, safety guard rail, personal safety equipment, fitting equipment, spreader bars, turnbuckles, blocking devices, air pressure or vacuum equipment, soap suds,

Sub-tasks	Enabling Objectives	Tools & Equipment
	ability to attach a variety of equipment	linseed oil, penetrating oil
	ability to compute	
	ability to use a chalk line	
	ability to lift, move and carry equipment	
	ability to use hand tools	
	ability to operate welding equipment	
	ability to measure	
	ability to fit and weld clips	
	ability to give hand signals	
	ability to attach rigging devices	
	ability to move obstructions or remove material from site	
	ability to assess skills and assign tasks to workers, such as signallers, ground riggers, hoisting operators and connectors	
	ability to establish and maintain effective working relationships with superiors, subordinates and associate workers	
	ability to govern self and others with regard to punctuality, tact, honesty and reliability	
	ability to find out exactly what must be done and how it is to be done	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lay out and mark parts to be removed	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 15 **Performs stress relieving activities for vessels.**

Trend: Towards larger, heavier sections being shipped to field sites.

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.01	Determines stress relieving requirements for vessels.	knowledge of stress relieving purposes, practices and methods ability to read and interpret drawings and specifications (NOT COMMON CORE)	drawings, specifications, manuals, special instructions

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	no	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.02	Selects appropriate lifting and moving devices.	knowledge of hoisting and rigging equipment and methods	crane, jacks, slings, shims, rollers, bricks, skids, formed plates, rail cars

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.03	Rigs and hoists or directs same for vessel.	knowledge of hoisting signals knowledge of use and purpose of hoisting and rigging devices knowledge of co-ordination of lifting operations ability to lift, climb and carry ability to follow manufacturers' recommendations ability to operate hand tools	slings, chokers, wire rope, crane, spreader bars, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.04	Places support mechanisms beneath vessel.	knowledge of proper and safe procedures and code requirements knowledge of supporting techniques ability to read and interpret drawings ability to place skids, formed plates, etc. ability to lift and carry	blocking devices, skids, formed plates, bricks, shoring, bracing

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.05	Ensures nozzles, manways and other openings are with vessel.	knowledge of proper and safe procedures and code requirements	drawings, specifications

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings and specifications	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

15.06	Places supports under nozzles, manways and other openings.	knowledge of proper and safe procedures and code requirements	bricks
		knowledge of supporting techniques	
		ability to place supports	
		ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

15.07	Welds supports to form plates and vessel interior.	knowledge of proper and safe procedures and code requirements	welding machine, bracing material
		knowledge of provincial/territorial welding regulations	
		ability to read and interpret drawings	
		ability to weld	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

15.08	Removes hoisting equipment.	knowledge of use and purpose of hoisting and rigging devices	wrenches
		ability to lift, climb and carry	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to follow manufacturers' recommendations ability to operate hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

15.09	Places baffle plates.	knowledge of code requirements knowledge of methods of installing burner ports in furnace to prevent direct flame on vessel surface ability to read and interpret drawings ability to lift, climb and carry ability to follow manufacturers' recommendations ability to weld ability to operate hand tools	drawings, specifications, welding machine, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

15.10	Inspects shoring, bracing, shims, skids and expansion rollers.	knowledge of required procedure ability to ensure that there is no possibility of fouling on heating or cooling	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
15.11	Moves vessel into furnace and seals furnace.	knowledge of safe handling procedures knowledge of equipment ability to operate equipment **(NOT COMMON CORE)**	furnace, rollers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	no	no	yes	yes	ND	ND

15.12	Operates furnace during heating and cooling operations.	knowledge of heating and cooling techniques knowledge of equipment ability to operate equipment **(NOT COMMON CORE)**	furnace

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	no	no	yes	yes	ND	ND

15.13	Applies straightening techniques, if required.	knowledge of straightening methods ability to follow directions	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

Task 16 Fabricates and assembles components.

Trend: Towards more technologically advanced equipment.

	Sub-tasks	Enabling Objectives	Tools & Equipment
16.01	Interprets drawings and specifications for component fabrication.	knowledge of code requirements knowledge of AWS standard welding symbols knowledge of pertinent safety regulations knowledge of gas cutting methods knowledge of techniques of fabrication and assembly of all components of boilers, heat exchangers, condensers, breaching and ductwork ability to read and interpret drawings and specifications	drawings, specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
16.02	Selects appropriate hoisting and rigging equipment.	knowledge of capabilities of different types of hoisting equipment knowledge of job sequence knowledge of job requirements	crane, boom truck, slings, chokers, special rigging devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
16.03	Fits and assembles component parts.	knowledge of cutting, measuring, welding, abrasive tools and techniques ability to read and interpret drawings and specifications	drawings, specifications, cutting equipment, welding equipment, power and hand operated abrasive equipment (grinder,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate tools and equipment	file), measuring tape, squares, level, gauges, micrometers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 17 **Performs informal inspections of completed weldments.**

Trend: Towards more care and inspection being done.

	Sub-tasks	Enabling Objectives	Tools & Equipment
17.01	Determines allowable weld defects.	knowledge of relevant codes and tolerances knowledge of quality control procedures ability to read and interpret drawings **(NOT COMMON CORE)**	drawings, specifications, manuals

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	no	no	no	no	yes	yes	ND	ND

17.02	Examines materials prior to, during and after welding.	knowledge of appearance of face and edges of material ability to identify lamination, scabs, rust, edge preparation, alignment and gap	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to perform tactile and visual weld inspection **(NOT COMMON CORE)**	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	no	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
17.03	Checks dimensional accuracy of weldment.	knowledge of codes ability to measure	specifications, measuring tape, callipers, gauges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
17.04	Checks weld appearance for surface flaws.	knowledge of visual inspection methods knowledge of defects, such as cracks, porosity, unfilled craters and undercutting ability to perform tactile and visual weld inspection	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
17.05	Performs dye penetrant test.	knowledge of application ability to manipulate testing materials	penetrant developer, rags, cleaner

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
17.06	Performs magnetic particle test.	knowledge of testing procedure ability to manipulate testing equipment **(NOT COMMON CORE)**	magnetic flux and magnetic particle equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	yes	no	no	yes	ND	ND

Task 18 Prepares vessels and performs tests.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
18.01	Prepares butt welds for radiographic testing.	knowledge of operation of radiographic machine knowledge of the number and location of radiographs to be taken on vertical, horizontal and other welds ability to perform tactile and visual weld inspection ability to chip, grind and clean weld surfaces to remove irregularities and form a smooth surface for operation of radiographic (X-ray) machine	joint chipping tools, power grinder

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
18.02	Marks and identifies welds which have been radiographed.	knowledge of code requirements ability to manipulate small items	marking paint, paint markers, brush, tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	no	yes	no	yes	yes	ND	ND

18.03	Repairs defects by gouging, rewelding or other techniques.	knowledge of code specifications for repair knowledge of welding techniques ability to weld	welding equipment, grinder, chipping tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

18.04	Prepares tank bottoms for testing by air pressure, vacuum or diking methods.	knowledge of testing and inspection methods and techniques knowledge of ASME and other standards knowledge of methods of diking and piping for testing tank bottoms ability to manipulate testing materials	air pressure or vacuum equipment, soap suds, linseed oil, penetrating oil, water, hoses, broom, shovel

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

18.05	Prepares tank roofs for testing.	knowledge of testing and inspection methods and techniques	air compressor or vacuum equipment, soap suds, linseed oil,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of ASME and other standards ability to manipulate testing materials	penetrating oil, water, broom, shovel

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

18.06	Prepares vessels and heater exchangers for hydrostatic pressure test.	knowledge of methods for attaching temporary gauges, air- or water lines to vessels knowledge of specifications knowledge of hydrostatic testing methods knowledge of application and use of high-pressure water pumps knowledge of testing requirements of government inspectors ability to attach pressure gauges and air- or water lines to vessel ability to operate hand tools	wrenches, hand tools, pumps, gauges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

18.07	Controls water or air pressure for examination.	knowledge of safe procedures ability to operate equipment	hydrostatic testing equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
18.08	Drains vessel and removes air- or water lines.	knowledge of safe procedures ability to operate hand tools	wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 19 Performs lay-up, removal and repair of fibreglass components.

Trend: Towards the increased use of fibreglass-reinforced products (FRP) on air handling systems (scrubbers, ducting, breaching, stacks) and tanks, hoppers and vessels.

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.01	Interprets drawings and specifications.	knowledge of use and purpose of cure systems, glass reinforcements and tool and equipment lists ability to read, interpret, and adhere to relevant drawings, codes and specifications	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.02	Off-loads tools and equipment.	knowledge of use, purpose and organization of cure system areas and glass reinforcement cutting areas ability to select and prepare site ability to operate power and manual lifting and moving devices	forklift, barrel dolly

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.03	Prepares work area.	knowledge of types of staging platforms knowledge of techniques for uncoiling, hooking up and leading cure system hoses to work location knowledge of techniques for setting up compressor and sandblast equipment to work location knowledge of methods of supplying weather protection ability to lift, move and carry equipment	safeway scaffolding, tubular scaffolding. staging planks, tie wire. hammer, saws, pliers, hand lines, adjustable wrenches, pipe wrenches, cure system barrel heaters. extension cords. canvasses for outside work

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.04	Sandblasts surface to be repaired or fabricated.	knowledge of methods of operating and servicing compressors, sandblasting equipment and personal protection equipment knowledge of material and steps required to deal with delaminations, blisters, wrinkles, pits and foreign inclusions ability to lift and handle materials and keep sandpot full	compressor, wrenches, fuel, oil, water, sandblast hoses, nozzles, blasting sand, blaster's hood, apron, lenses, coveralls, fresh air supply, heavy leather gloves, quartz lights, extension cords, disc grinder, pry bar, hand lines, air mover with hose for inside work

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	yes	no	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.05	Prepares surface for glassing.	knowledge of techniques for final dressing of work surface	quartz lights, extension cords, disc grinder,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of moisture and humidity requirements ability to feather old surface to receive new surface ability to apply prepared polyester putty to misaligned surfaces ability to remove blasting sand if necessary	respirator, eye protection, gloves, polyester putty, catalyst, DMA, spatulas, cardboard, vacuum cleaner

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

19.06	Prepares resin and glass reinforcements.	knowledge of methods of preparing and safe handling of resin, catalyst and chemical additives ability to cut glass reinforcements ability to operate small power and hand tools	barrel dolly, bung remover, electric drill with mixing paddle, barrel heaters, extension cords, resin spray equipment, 20 litre bucket, acetone, rubber gloves, eye protection, fire extinguisher, various wrenches, necessary types of glass reinforcements, straight-edge, measuring tape, framing square, cutting table, dry wall knives and blades, plastic bags, masking tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.07	Applies glass reinforcements to surface.	knowledge of methods of safe handling of catalyzed resin knowledge of proper sequence of application of glass reinforcement and rolling-out process ability to operate spray guns	fire extinguisher, suitable respirator, rubber gloves, eye protection, 20 litre bucket, acetone, mohair rollers, aluminum serrated rollers, scissors, quartz lights, extension cords, hand lines

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

19.08	Applies wax coat.	knowledge of techniques for preparing and applying wax top coat ability to lift, carry and use small hand tools	20 litre bucket, large mohair roller with extension handle, paraffinated resin, acetone, fire extinguisher, eye protection, rubber gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

19.09	Inspects laminations.	knowledge of methods to visually inspect for voids, wrinkles, delaminations, resin dryness, resin richness, crazing and foreign inclusions ability to detect imperfections visually as well as by feeling the work	quartz lights, extension cords

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
19.10	Removes fibreglass material.	knowledge of types of staging platforms knowledge of methods of supplying weather protection knowledge of methods to visually inspect for voids, wrinkles, delaminations, resin dryness, resin richness, crazing and foreign inclusions ability to detect imperfections visually as well as by feeling the work ability to read, interpret, and adhere to relevant drawings, codes and specifications ability to select and prepare site ability to operate power and manual lifting and moving devices ability to lift, move and carry equipment ability to feather old surface to receive new surface ability to cut glass reinforcement ability to operate small power and hand tools	drawings, specifications, pencil, paper, forklift, safeway scaffolding, tubular scaffolding, staging planks, tie wire, hammer, saws, pliers, hand lines, adjustable wrenches, pipe wrenches, extension cords, canvases for outside work, compressor, wrenches, fuel oil, water, coveralls, fresh air supply, heavy leather gloves, disk grinder, air movers with hose for inside work, eye protection, vacuum cleaner, air drill, electric drill, straightedge, measuring tape, framing square, fire extinguisher, suitable respirator

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

BLOCK D RIGGING AND HOISTING

Task 20 Fabricates and prepares rigging and hoisting apparatus.

Trend: Changes of types of wire rope and the addition of new synthetic materials; use of computer aided design (CAD).

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.01	Selects materials according to job requirements.	knowledge of construction of wire rope, fibre rope and other materials knowledge of material to be lifted	specifications and tables, rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

20.02	Inspects materials for evidence of wear or damage.	knowledge of construction of wire rope, fibre rope and other materials knowledge of criteria for damage to materials ability to read and understand manufacturers' recommendations ability to measure and use wear gauges	wear gauges, callipers, verniers, marline spikes

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

20.03	Measures and cuts materials.	knowledge of material knowledge of manufacturers' recommendations	measuring tape, cutting or burning equipment, bolt cutters, shears, knife, seizing tool, whipping cord

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of rules, laws and site requirements knowledge of load requirements ability to select and operate small hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.04	Makes eye splice in ropes.	knowledge of ropes and materials knowledge of chokers, spreaders, slings, blocks as well as other rigging and hoisting devices ability to select and operate small hand tools	wire cutters, burning equipment, vice grips, marline spike or fid, hammer, mallet, whipping material, cable clips, pincers, pliers, seizing wire, seizing tool, rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	no	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.05	Makes splices in fibre ropes.	knowledge of function, purpose, advantages and disadvantages of various types of splices, methods, and techniques for making splices ability to make splices, such as short splice, thimble splice, cut splice, crown knot or back splice	cutting equipment, marline spike, fid, whipping material, pincers, pliers, hammer or mallet, rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.06	Ties knots and makes hitches in ropes.	knowledge of function, purpose, advantages and disadvantages of a wide variety of knots and hitches, including hitches loops and bends ability to manipulate fibre, nylon and ropes made of other materials to create items, such as tag lines, anchors and supports	fibre, nylon and other synthetic ropes, rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

20.07	Reeves tackle blocks.	knowledge of safe working loads for various types of rope techniques knowledge of correct lacing and reeving methods knowledge of blocks and falls and their uses ability to calculate the mechanical advantage of various block and tackle arrangements ability to lift, carry and manipulate heavy materials	specifications and tables, formulas for figuring line parts, safe working loads, correct sheaves, hooks, rigging manual

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

20.08	Selects or assembles slings to suit job requirements.	knowledge of material types knowledge of strength and lifting capacity of slings	wrenches, gloves, rope

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of advantages and disadvantages of different types of slings knowledge of manufacturers' recommendations knowledge of function, purpose, advantages and disadvantages of various sling arrangements, such as single vertical hitch, bridle hitch, single, double and double wrap basket hitches, and single and double choker hitches	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.09	Selects and installs steel drop forged cable clips.	knowledge of types and functions of cable clips available knowledge of correct placement of saddle on live end of ropes being joined ability to select and operate small hand tools	rigging manual, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
20.10	Dismantles and stores hoisting and rigging apparatus.	knowledge of correct storage and maintenance methods for various materials ability to lift and carry	wrenches, gloves, rope, slings, chokers, spreaders, tag lines, lashing, guy wires

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 21 Erects scaffolds and other working platforms.

Trend: Towards increased safety requirements.

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.01	Determines scaffold or platform requirements.	knowledge of regulations and laws (Construction Safety Act, WCB regulations, as well as company standards and regulations) knowledge of location of various services to site knowledge of sources of information regarding ground or other supporting conditions knowledge of various types of scaffolding and platforms knowledge of various types of scaffolding and platform supports, such as thrust-out beam, needle beams and outrigger scaffolds ability to interpret drawings ability to measure ability to examine structure to determine access required	drawings, specifications, WCB regulations, measuring tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.02	Obtains necessary scaffold or platform materials.	knowledge of material sources ability to communicate orally or in writing	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.03	Inspects scaffold or platform material for defects.	knowledge of scaffolding types, features, materials, terms and regulations knowledge of types of possible defects to look for ability to detect damage visually as well as by feeling the material	scaffold material, regulations or specifications, measuring tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.04	Assembles or constructs scaffold or platform frame.	knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools ability to operate hand or power hoisting equipment (ropes and tuggers)	scaffold materials, hammer, saws, pliers, wire, hoisting equipment, wrenches, spirit level, assorted small hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.05	Installs steel, wood or aluminum planks.	knowledge of scaffolding types, features, materials, terms and regulations knowledge of regulations regarding safe capacities knowledge of regulations regarding safe working spans	various types of scaffold planks, hammer, saws, pliers, wire, hoisting equipment, wrenches, spirit level, assorted small hand and power tools

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift, climb and carry ability to install and secure planks using small hand tools ability to operate hand or power hoisting equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

21.06	Installs toe boards and guard rails at working level.	knowledge of safety requirements knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools ability to operate hand or power hoisting equipment	hammer, saws, pliers, wire, hoisting equipment, wrenches, spirit level, assorted small hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

21.07	Installs guy wires and outriggers as required.	knowledge of safe working practices knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools	guy wires and outriggers, pliers, wire, wrenches, spirit level, assorted small hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.08	Installs lifelines where required.	knowledge of safe working practices ability to lift, climb and carry ability to select ability to tie appropriate knots in rope	rope

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
21.09	Inspects completed scaffold or platform.	knowledge of precautions necessary to ensure safety of workers knowledge of scaffolding types, features, materials, terms and regulations ability to ensure all components are secure and safe	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 22 Dismantles scaffolds and working platforms.

Trend: Towards increased safety requirements.

	Sub-tasks	Enabling Objectives	Tools & Equipment
22.01	Determines sequence of dismantling.	knowledge of safe working practices	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of scaffolding types, features, materials, terms and regulations	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
22.02	Removes handrails and toe boards.	knowledge of safe working practices knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools ability to tie appropriate knots in rope ability to lower materials using ropes, tuggers or other hoisting equipment	pliers, wrenches, hoisting equipment, assorted hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
22.03	Removes guy wires, outriggers and lifelines.	knowledge of safe working practices knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools	pliers, wrenches, hoisting equipment, assorted hand and power tools

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to tie appropriate knots in rope ability to lower materials using ropes, tuggers or other hoisting equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
22.04	Removes scaffold or platform planks.	knowledge of safe working practices knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry ability to select and operate hand and power tools ability to tie appropriate knots in rope ability to lower materials using ropes, tuggers or other hoisting equipment	pliers, wrenches, hoisting equipment, assorted hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
22.05	Disassembles scaffold or platform frame.	knowledge of safe working practices knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry	pliers, wrenches, hoisting equipment, assorted hand and power tools

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to select and operate hand and power tools ability to tie appropriate knots in rope ability to lower materials using ropes, tuggers or other hoisting equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

22.06	Stacks or stores material.	knowledge of safe working practices knowledge of job site knowledge of future use of material knowledge of scaffolding types, features, materials, terms and regulations ability to lift, climb and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 23 Hangs swing stages from structures.

Trend: Safety has become the number one consideration.

	Sub-tasks	Enabling Objectives	Tools & Equipment
23.01	Determines swing stage requirements.	knowledge of regulations and laws (Construction Safety Act, WCB	drawings, specifications, WCB

	Sub-tasks	Enabling Objectives	Tools & Equipment
		regulations, company standards and regulations and manufacturers' recommendations) knowledge of location of various services to site knowledge of sources of information regarding supporting conditions knowledge of various types of swing stages and boatswain's chairs knowledge of means of securing and supporting various types of swing stages and boatswain's chairs ability to interpret drawings ability to measure ability to examine structure to determine access required	regulations, measuring tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

23.02	Obtains necessary swing stage materials.	knowledge of material sources ability to communicate orally or in writing	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

23.03	Inspects swing stage equipment for defects.	knowledge of swing stage types, features, materials, terms and regulations	swing stage equipment, regulations or

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of types of possible defects to look for	specifications, measuring tools
		knowledge of manufacturers' recommendations	
		ability to detect damage visually as well as by feeling the material	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

23.04	Attaches cables, lifting blocks and hoisting unit.	knowledge of safety precautions when working at extreme heights	wire rope, cable clips, hand tools, wrenches
		knowledge of standards and specifications for lashing and fastening cable	
		knowledge of personal lifting techniques while working in awkward positions	
		knowledge of appropriate means to attach cables, lifting blocks and hoisting unit to scaffold and to structure	
		knowledge of proper balance in attaching cables, blocks, etc.	
		ability to use physical strength and agility	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

23.05	Attaches lifelines for workers.	knowledge of secure points and proper locations to attach lifelines	rope, cables, wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of limiting loads on scaffolds knowledge of value of periodic inspection of all lines and equipment ability to tie appropriate knots	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
23.06	Ensures safety of personnel on site before operating stage.	knowledge that loads should not be swung over people knowledge of means of notifying all personnel of possible hazard knowledge of appropriate barricades and signs to be erected ability to communicate clearly ability to use hand and power tools	warning signs, rope, barricades, safety manual, hand and power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
23.07	Dismantles swing stage equipment at completion of use.	knowledge of safety precautions when working at extreme heights knowledge of site and other regulations knowledge of personal lifting techniques while working in awkward positions ability to lift and carry	hand tools, wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of safe methods of maintaining and storing stage materials	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 24 **Uses ropes, slings and hoists for rigging loads.**

Trend: Crane capacities are increasing and larger machines are being built; there are also ongoing changes to type of wire rope.

	Sub-tasks	Enabling Objectives	Tools & Equipment
24.01	Selects rigging equipment to suit job requirements.	knowledge of safe rigging procedures and techniques knowledge of types of rigging materials, such as cable clips, chains, eyebolts, turnbuckles, spreader bars, equalizers and swivels knowledge of rope types and load capacities ability to read and understand written information	rigging manual, specifications and tables

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

24.02	Inspects rigging materials for damage and wear.	knowledge of construction of ropes and rigging hardware	rigging manual, manufacturers' specifications, wire brush, rags, cleaning

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of criteria for damage to ropes and hardware knowledge of how to clean wire rope and rigging materials for inspection ability to look for evidence of wear or damage ability to determine when replacement is required ability to measure and use wear gauges ability to read and understand manufacturers' recommendations	agents, gloves, mask, face shield, eye wash station, wear gauges, callipers, verniers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

24.03	Removes from service unsafe rope and rigging material.	knowledge of manufacturers' recommendations and regulations governing the use of rope, wire rope, straps, slings and hardware	face shield

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

24.04	Signals hoist and crane operators.	knowledge of international signals and two-way radio equipment knowledge of hoist and crane operation terminology knowledge of job site and potential hazards	chart of international signals, two-way radio

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to communicate using hand or audio signals	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
24.05	Dismantles, inspects and stores hoisting and rigging equipment.	knowledge of storage and maintenance requirements for various types of ropes, hoisting equipment and materials knowledge of safety precautions and proper handling of materials knowledge of construction of ropes and rigging hardware knowledge of criteria for damage to ropes and hardware knowledge of how to clean wire rope and rigging materials for inspection ability to look for evidence of wear or damage ability to determine when replacement is required ability to measure and use wear gauges ability to read and understand manufacturers' recommendations	socket and adjustable wrenches, fibre rope, tie wire, wire brushes, lubricants, rigging manual, manufacturers' specifications, rags, cleaning agents, gloves, mask, face shield, eye wash station, wear gauges, callipers, verniers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 25 **Assembles and disassembles guy derricks, stationary cranes, gin poles, monorail systems, tower cranes, jacking systems and other hoisting equipment.**

Trend: Fewer derricks and gin poles and more cranes are being used.

	Sub-tasks	Enabling Objectives	Tools & Equipment
25.01	Unloads, stores and assembles as per manufacturers' specifications.	knowledge of assembly sequence knowledge of equipment knowledge of manufacturers' specifications knowledge of safe handling procedures to prevent damage ability to follow written and diagrammed instructions ability to operate power lifting equipment	boom truck, fork lift, crane, slings, chokers, spreaders, special lifting devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 26 **Determines load weights.**

Trend: To load moment systems and load weight indicators on cranes. To more emphasis on the operator knowing the exact weight to be lifted. This has come about due to changes in the design of cranes and the fact that load chart capacities for new cranes are now based largely on structural rather than stability factors.

	Sub-tasks	Enabling Objectives	Tools & Equipment
26.01	Accesses all available information.	knowledge of sources of information	packing slips, way bills, drawings,

	Sub-tasks	Enabling Objectives	Tools & Equipment
			engineering specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

26.02	Confirms load weight.	ability to calculate simple load weights ability to refer to past experience	calculator, scales, any available references

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 27 Determines rigging requirements.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
27.01	Selects slings.	knowledge of types of slings knowledge of safe working loads of various slings in various configurations knowledge of working conditions which may affect the performance of slings such as acids and other caustic substances	sling capacity charts, slings, calculator

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
27.02	Selects hardware.	knowledge of types of hardware knowledge of safe working loads of various hardware items in various configurations knowledge of working conditions which may affect the performance of hardware items such as acids and other caustic substances	hardware capacity charts, hardware, calculator

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

27.03	Determines number of parts of line required.	knowledge of load weight, line pull, safe working load of cable, rigging formulas and trade mathematics	calculator, charts, manuals

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 28 Selects cranes/hoisting equipment with the capability to do the job.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
28.01	Determines rigging requirements.	knowledge of rigging and hardware types	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
28.02	Determines net capacity of crane/hoisting equipment.	knowledge of gross capacity, radii and configuration of boom knowledge of atmospheric and site conditions knowledge of crane types	calculator, charts, measuring devices, manufacturers' manuals

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
no	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 29 Ensures site preparedness.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
29.01	Inspects area for hazards and obstructions.	knowledge of regulations and laws knowledge of location of various services to site knowledge of sources of information regarding ground or other supporting conditions	drawings, specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

29.02	Makes necessary changes to site.	ability to move obstructions or bring material to access work area	shovel, forklift, trucks and earth-moving equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
29.03	Notifies proper authorities to rectify problems.	knowledge of appropriate authorities to contact	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 30 **Identifies signaller.**

Trend: More emphasis is being placed on using signallers that are properly trained and qualified.

	Sub-tasks	Enabling Objectives	Tools & Equipment
30.01	Consults site management or crew.	knowledge of who to consult ability to determine types of communication to be used ability to communicate	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
30.02	Confirms signaller's ability to use proper signals.	knowledge of signals ability to teach or provide signaller with information	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 31 Prepares cranes for transport.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
31.01	Loads and unloads cranes for highway transport.	knowledge of regulations and procedures knowledge of manufacturers' recommendations knowledge of dimensions and weight of equipment knowledge of specific situations related to loading and unloading ability to operate cranes ability to visualize and rationalize what may happen during operation	helper crane, rigging equipment, wrenches, power and hand tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

31.02	Blocks and secures cranes for highway transport.	knowledge of proper procedures, regulations and practices knowledge of manufacturers' recommendations ability to use basic hand and power tools	claw-hammer, saws, chisels, come-alongs, nails, bolts, cutting torch, threaded rods, lashing, wrenches, welding machine

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

31.03	Loads and unloads cranes for rail transport.	knowledge of regulations and procedures	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of dimensions and weight of equipment knowledge of specific situations related to loading and unloading knowledge of manufacturers' recommendations ability to visualize and rationalize what may happen during the operation	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
no	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
31.04	Blocks and secures cranes on rail car.	knowledge of proper procedures, regulations and practices knowledge of manufacturers' recommendations ability to use basic hand and power tools	claw-hammer, sledgehammer, saws, chisels, come-alongs, nails, bolts, cutting torch, threaded rods, lashing, wrenches, welder

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
no	yes	NV	yes	yes	yes	no	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
31.05	Loads and unloads cranes from barges and ships.	knowledge of regulations and procedures knowledge of dimensions and weight of equipment knowledge of specific situations related to loading and unloading knowledge of manufacturers' recommendations	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to visualize and rationalize what may happen during operation	
		(NOT COMMON CORE)	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	no	no	no	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
31.06	Blocks and secures cranes on barges and ships.	knowledge of proper procedures, regulations and practices knowledge of manufacturers' recommendations ability to use basic hand and power tools (NOT COMMON CORE)	claw-hammer, sledgehammer, saws, chisels, come-alongs, nails, bolts, cutting torch, threaded rods, lashing, wrenches, welder

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	no	no	no	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
31.07	Blocks and secures components.	knowledge of blocking needs and techniques knowledge of manufacturers' recommendations ability to use basic hand and power tools	claw-hammer, sledgehammer, saws, chisels, come-alongs, nails, bolts, cutting torch, threaded rods, lashing, wrenches, welder

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 32 **Assembles hydraulic and lattice boom cranes.**

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
32.01	Rigs and assembles tracks and car body, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
32.02	Rigs and installs or extends outriggers, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
32.03	Rigs and installs upper works, if necessary.	knowledge of crane and components	ball-peen hammer, claw-hammer, sledgehammer,

Sub-tasks		Enabling Objectives	Tools & Equipment
		knowledge of basic hand tools and bolts knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.04	Rigs and installs or extends counterweights, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.05	Removes and stores trailing axles, if necessary.	knowledge of crane and components knowledge of basic hand tools	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

32.06	Rigs and assembles main boom and components, if necessary.	knowledge of crane and components knowledge of basic hand tools knowledge of and ability to select set-up area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.07	Installs optional boom components, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select set-up area ability to select and use hand tools	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.08	Installs and reeves hoist lines, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.09	Inspects all components.	knowledge of crane and components ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

32.10	Directs raising of boom to working position, if necessary.	knowledge of crane and components knowledge of crane operation	

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of hand signals	
	knowledge of and ability to select set-up area	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 33 **Disassembles hydraulic and lattice boom cranes.**

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.01	Directs lowering of boom onto blocking, if necessary.	knowledge of crane and components	blocking
		knowledge of signals	
		knowledge of crane operation	
		knowledge of and ability to select disassembly area	
		ability to select and place blocking	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.02	Removes hoist lines, if necessary.	knowledge of crane and components	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, pry bar
		knowledge of crane operation	
		knowledge of and ability to select disassembly area	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to select and use hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

33.03	Removes optional boom components.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

33.04	Disassembles boom, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.05	Retracts or removes counterweights, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.06	Removes upper works, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.07	Removes outriggers, if necessary.	knowledge of crane and components	ball-peen hammer, claw-hammer, sledgehammer,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.08	Disassembles tracks and car body, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
33.09	Rigs and loads out booms and crane components.	knowledge of crane and components knowledge of basic hand tools and bolts	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

33.10	Installs trailing axles, if necessary.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 34 Assembles and disassembles specialty equipment and attachments.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
34.01	Follows manufacturers' recommendations for safety and procedure.	knowledge of crane and components knowledge of basic hand tools and bolts knowledge of and ability to select assembly or disassembly area ability to select and use hand tools ability to follow manufacturers' recommended procedures and working practices as described in their operator's manual	ball-peen hammer, claw-hammer, sledgehammer, wrenches, drift pins, line-up bars, helper crane, rigging, impact wrenches, punches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

BLOCK E RECEPTION, PREPARATION, INSTALLATION, REMOVAL, REPAIR AND MAINTENANCE OF FABRICATED COMPONENTS

Task 35 Inspects vessels, components and equipment for defects or damage.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
35.01	Interprets drawings and specifications.	knowledge of abbreviations, symbols, reference points and terminology	drawings, specifications, pencil, paper

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings and specifications	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

35.02	Determines starting point and sequence of inspection.	knowledge of repair/maintenance schedule knowledge of a wide variety of vessels and equipment and their component parts	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

35.03	Determines safety requirements for worker(s) performing inspection.	knowledge of safety equipment and possible hazards associated with various types of vessels and equipment knowledge of a wide variety of vessels and equipment and their component parts	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

35.04	Prepares vessel or equipment for inspection.	knowledge of construction of equipment to be inspected knowledge of a wide variety of vessels and equipment and their component parts	drawings, specifications, impact wrenches, duct work, fans, mask, gloves, eye protection, portable lights

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of manways, ladders and other necessary components ability to operate hand and power tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

35.05	Inspects vessel or equipment for defects.	knowledge of a wide variety of vessels and equipment and their component parts knowledge of construction of equipment to be inspected knowledge of manways, ladders and other necessary components ability to operate hand and power tools	drawings, specifications, impact wrenches, duct work, fans, mask, gloves, eye protection, portable lights, wire brush, broom, testing equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 36 **Prepares for installation, repair or maintenance.**

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.01	Determines starting point and sequence of work.	knowledge of a wide variety of vessels and equipment and their component parts	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.02	Directs activities of helpers, apprentices and associate tradespersons.	knowledge of general type of work to be done	
		knowledge of subtrades and schedules	
		knowledge of contract needs	
		ability to assess skills	
		ability to interpret drawings and written instructions	
		ability to communicate orally and in writing	
		ability to establish and maintain effective working relationships with superiors, subordinates and associate workers	
		ability to govern self and others with regard to punctuality, tact, honesty and reliability	
		ability to find out exactly what must be done and how it is to be done	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

36.03	Obtains materials and component parts.	knowledge of local procedures	
		knowledge of techniques and processes to accomplish work	
		knowledge of tools	
		knowledge of materials	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of where to obtain tools and equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.04	Prepares component parts adjacent to work area.	knowledge of repair schedule ability to lay out components for sequential use ability to rig materials ability to operate material moving devices	forklift, hoist, slings

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.05	Selects and installs hoisting and rigging devices.	knowledge of a wide variety of hoisting and rigging devices, techniques and methods knowledge of signals knowledge of the use of swing staging or boatswain's chair	crane, tugger, slings, clamps, wire rope, swing stages, boatswain's chairs, lifelines, ladders

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.06	Prepares vessel or equipment for repair or maintenance.	knowledge of construction of equipment to be inspected	drawings, specifications, impact wrenches, duct work, fans, mask, gloves, eye protection, portable

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of a wide variety of vessels and equipment and their component parts ability to operate hand and power tools	lights, grinder, broom, high-pressure water hose, eye or face shield, hearing protection

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.07	Measures, prepares and marks repair or maintenance location.	knowledge of measuring and marking methods ability to lay out for components ability to use layout tools ability to read and interpret drawings and specifications	measuring tape, spirit level, chalk, centre punch, hammer, chalk line

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.08	Removes damaged or worn materials, equipment and components.	knowledge of hoisting signals knowledge of removal and installation techniques for components, such as refinery tubes, tray collars, bolting plates, weirs (outlets and inlets), seal pans, baffles and baffle braces ability to attach rigging devices ability to give signals	hoisting equipment, vessel components, crane, rigging equipment, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
36.09	Directs hoisting and lowering of materials, equipment and components.	knowledge of hoisting signals ability to attach rigging devices ability to give signals	hoisting equipment, vessel components, crane, rigging equipment, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 37 **Installs, repairs, maintains, removes and demolishes penstock sections.**

Trend: Towards new, more efficient paints, epoxy and coatings; increased use of new or exotic metal alloys, as well as wire feed, submerged-arc or other types of welding machines and larger prefabricated penstock sections.

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.01	Establishes a laydown yard.	knowledge of hydro-electric power generating equipment knowledge of penstock and component parts ability to interpret drawings, flow charts and/or construction schedules, material and tool lists and area maps	pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.02	Receives and sets up hoisting equipment.	knowledge of use and purpose of hoisting and rigging devices knowledge of crane types and set-up techniques	crane, slings, shackles, hand lines, hammer, pry bar, hand wrenches, rigging belts, impact wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift, climb and carry ability to follow manufacturers' recommendations ability to operate hand and power tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.03	Lays out penstock sections for sequential use.	knowledge of construction schedules knowledge of methods of off-loading large components knowledge of signals knowledge of hoisting equipment and rigging procedures and techniques ability to place sections in order of use	crane(s), slings, shackles, hand lines, dunnage/cribbing, spud and hand wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.04	Prepares penstock sections for installation, repair and maintenance.	ability to read and interpret drawings knowledge of methods of repairing damage that occurred in transit knowledge of material preparation, such as installing lifting lugs and removing protective coatings	welding equipment, oxy-acetylene cutting equipment, hydraulic jacks, dogs and wedges, hammer, measuring tape, level, squares, pry bar, crane(s), slings, shackles, preheating torches, rags, solvents and cleaners, grinding

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of techniques and methods of assembling component parts prior to installation at penstock site ability to operate a wide range of hand and power tools safely	and buffing tools, hand lines, eye protection, mask, protective clothing and equipment, electric tools, air power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.05	Prepares penstock site for installation, repair and maintenance.	knowledge of installation techniques for erecting staging platforms knowledge of efficient disbursement of tools and equipment knowledge of preparation of pedestal bolts if any knowledge of set-up of crane(s), high lines or other rigging equipment knowledge of proper techniques and methods of establishing elevation points for penstock sections ability to read and interpret drawings and specifications	crane(s), slings, shackles, die nuts, hand, crescent and socket wrenches, ladders, welding equipment, oxy-acetylene cutting equipment, files, hammer, pry and wrecking bars, transit, measuring tape, piano wire, carpenter's square, drawings, tool and material lists, compressor and air tools, electric panels for lighting, electric tools, hand lines

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.06	Loads and transports penstock sections to work site.	knowledge of cranes and a wide variety of rigging techniques and methods knowledge of signals	crane(s), slings, shackles, hand lines, cribbing/dunnage, trucks, trailers,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of sequence of work ability to read and follow construction schedules ability to operate hand and power equipment ability to lift and carry ability to read and interpret drawings	drawings and construction schedules

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.07	Moves penstock sections.	knowledge of methods and procedures for rigging and hoisting ability to give signals	crane(s), high lines, air tugger, slings, shackles, hand lines, Tirfors, chain block hoist, come-alongs, spud wrenches, safety belts and lines

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.08	Secures penstock sections in rough fitting position.	knowledge of penstock installation techniques knowledge of a wide variety of fitting methods and techniques knowledge of erection of staging platforms ability to read and interpret drawings and specifications	welding equipment, oxy-acetylene cutting equipment, hand wrenches, socket wrenches, air impact gun, air compressor and hoses, hydraulic rams and jacks, Tirfors, screw jacks, come-alongs, chain block hoist, hand lines, spirit level, pry and/or

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to give signals ability to align components ability to weld ability to lift, climb and carry	wrecking bars, drift pins, spud wrenches, hammer, dogs and wedges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.09	Detaches crane(s) or hoisting devices from penstock section.	knowledge of rigging signals ability to operate hand and power tools ability to lift, climb and carry	hand wrenches, socket wrenches, air impact gun, air compressor and hoses, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.10	Tack welds penstock into final position.	knowledge of a wide variety of fitting techniques and methods knowledge of welding code requirements in regard to welding and tacking penstock sections ability to read and interpret drawings and specifications ability to use transit to elevate, orientate, align and space penstock sections ability to operate hand and power tools ability to lift, climb and carry	welding equipment, oxy-acetylene cutting equipment, piano wire, centre line equipment, transit, measuring tape, dogs and wedges, hammer, hydraulic jacks and rams, pry and wrecking bars, hand wrenches, drift pins, air compressor and hoses, air tools (i.e. chipping gun), electric panels boxes and electric tools, grinder, buffer, lighting, preheating torches, ladders, Tirfors, chain block

	Sub-tasks	Enabling Objectives	Tools & Equipment
			hoist, come-alongs, screw jacks, arc-air gouger

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.11	Completes interior and exterior welding of penstock.	knowledge of a wide variety of welding techniques and methods, such as root pass, fill pass and capping pass knowledge of drawings and specifications knowledge of welding code requirements in regard to welding and tacking penstock sections ability to operate hand and power tools ability to lift, climb and carry ability to pass weld procedure test prior to welding on penstock ability to perform such operations as preheating, back gouging, grinding, buffing as well as manual and automatic chipping ability to operate stick, wire feed and submerged-arc welding equipment	welding equipment, preheating equipment, manual and automatic chipping guns, grinder, buffer, arc-air gouger, air compressor and hoses, air ventilating equipment, protective breathing equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.12	Tests completed welds to assure weld quality.	knowledge of welding codes and requirements pertaining to finished product knowledge of methods and techniques involved in repair of weld flows ability to use X-ray, mag-particle, dye penetrant methods and equipment	testing equipment, welding equipment, grinder, buffer, arc-air gouger, air compressor and hoses, preheating torches, breathing apparatus, ventilation equipment, manual and automatic chipping guns

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	no	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.13	Fixes penstock into permanent position.	knowledge of drawings and specifications knowledge of a wide variety of techniques and methods of affixing penstock in permanent position ability to operate hand and power tools ability to weld ability to lift, climb and carry ability to perform operations, such as burying small diameter penstock in ditches, installing hold-down straps to pedestals for exposed penstock and encasing (grouting) penstock in concrete	drawings, various types of wrenches, concrete pumping equipment, vehicles and equipment for backfilling penstock buried in ditches, crane, slings and shackles

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
37.14	Removes unnecessary materials from penstock.	knowledge of appropriate codes and requirements for finished interior surfaces of penstock knowledge of methods and techniques of rigging ability to operate oxy-acetylene cutting equipment, arc-air gouging machines and grinders ability to operate hand and power tools ability to weld ability to lift, climb and carry	drawings, oxy-acetylene cutting equipment, arc-air gouger, grinder, slings, shackles, crane, hand lines, air compressor and hoses, welding equipment, come-alongs, chain block hoist, ladders, large and small hammers, pry and wrecking bars

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.15	Pressure tests penstock.	knowledge of methods and techniques involved in performing pressure tests of penstocks knowledge of methods and techniques of rigging, fitting and welding of test cap to penstock knowledge of methods and techniques of removal of test cap after testing is complete ability to read and interpret drawings and specifications ability to operate hand and power tools ability to weld	drawings, crane(s), chokers, shackles, fitting tools, welding equipment, testing gauges, pumps and hoses, oxy-acetylene cutting equipment, grinder, air compressor and hoses, wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift, climb and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.16	Installs expansion joint and/or scroll case.	knowledge of the methods and techniques of preparation of penstock welded joints knowledge of methods and techniques of preparation and application of coatings knowledge of methods of installing expansion joint and/or scroll case ability to read and interpret drawings and specifications ability to operate hand and power tools ability to weld ability to lift, climb and carry	oxy-acetylene cutting equipment (manual or automatic) with magnetic track, centre punch, drawings, small hammer, measuring tape, air compressor and hoses, grinder, buffer, painting or coating application equipment (brushes, rollers, spray equipment)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

37.17	Removes, repairs and maintains penstock components.	knowledge of appropriate codes, standards and requirements for finished interior surface of penstock knowledge of methods and techniques of rigging ability to operate oxy-acetylene cutting equipment, arc-air gouging machines and grinders	drawings, oxy-acetylene cutting equipment, arc-air gouger, grinder, slings, shackles, crane(s), hand lines, air compressor and hoses, welding machine, come-alongs, chain block hoist, ladders, large and small

Sub-tasks	Enabling Objectives	Tools & Equipment
	ability to operate hand and power tools ability to weld ability to lift, climb and carry	hammers, pry and wrecking bars, plasma arc cutting and welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 38 Installs, removes, repairs and maintains appurtenances in vertical processing vessels.

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.01	Interprets drawings and specifications.	knowledge of abbreviations, symbols, reference points and terminology ability to read and interpret drawings and specifications	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

38.02	Determines starting point and sequence.	knowledge of construction schedule or flow chart knowledge of a wide variety of vessels and their component parts	drawings, specifications, pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.03	Obtains materials and component parts.	knowledge of local procedures knowledge of techniques and processes to accomplish work knowledge of tools knowledge of materials knowledge of where to obtain tools and equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

38.04	Prepares component parts adjacent to work area.	knowledge of construction schedule or flow chart ability to lay out components for sequential use ability to rig materials ability to operate material moving devices	forklift, hoist and slings

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

38.05	Selects and installs hoisting and rigging devices.	knowledge of a wide variety of hoisting and rigging devices, techniques and methods knowledge of signals knowledge of the use of swing staging or use of boatswain's chair	crane, tugger, blocks, slings, clamps, wire rope, swing stages, boatswain's chairs, lifelines, ladders

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.06	Measures and marks location of support rings and flanges.	knowledge of measuring and marking methods ability to read and interpret drawings and specifications ability to lay out for components ability to use layout tools	measuring tape, spirit level, chalk, centre punch, hammer, chalk line

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.07	Directs hoisting and lowering of support rings and components.	knowledge of hoisting signals knowledge of installation techniques for support rings and other components, such as tray collars, bolting plates, weirs (outlets and inlets), seal pans, baffles, baffle braces, trusses, pipe flanges and lock clamps ability to attach rigging devices ability to give signals	hoisting equipment, support ring components, vessel components, crane, rigging equipment, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.08	Tack welds or bolts rings and components to shell.	knowledge of welding equipment, methods and techniques knowledge of provincial and territorial welding regulations knowledge of a wide variety of fitting techniques and methods	electric arc welding equipment, mask, goggles, gloves, shields, wrenches, hammer, hydraulic jacks, hand and socket wrenches, impact wrenches, torque wrenches, vice-grips,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of strengths, purpose, torquing techniques, sequential bolting techniques for all types of bolts and nuts	clamps, drift pins, wedges, spirit level, dolly bars, speed wrenches, stickers
		knowledge of American Society for Testing Materials (ASTM) and Society of Automatic Engineers (SAE) grade marking for steel bolts	
		ability to read and interpret drawings and specifications	
		ability to operate hand and power tools	
		ability to lift, climb and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

38.09	Installs and clamps downcomers into position.	knowledge of basic trade practices	socket wrenches, impact wrenches, torque wrenches, vice-grips, clamps
		ability to read and interpret drawings	
		ability to install material according to specifications	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

38.10	Checks torque and tack welds nuts to trays.	knowledge of removal techniques for maintenance and repair requirements	torque wrenches, arc welding equipment
		ability to perform techniques in accordance with sequence of installation	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to tack weld	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.11	Installs, removes, repairs and maintains ladders and platforms on vertical towers.	knowledge of installation techniques for stairways, ladders and platforms knowledge of hoisting signals ability to attach rigging devices ability to give signals ability to operate hand and power tools ability to lift, climb and carry	crane(s), hoisting equipment, rigging hardware, wrenches, hammer, drift pins and bolting hardware

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.12	Operates overhead high line to service large diameter vessels.	knowledge of a wide variety of installation methods, tools, equipment and techniques knowledge of provincial, territorial and job site regulations knowledge of a wide variety of rigging techniques and methods ability to operate hand and power devices to position components	water level, piano wire, chain block hoist, come-alongs, tugger

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
38.13	Directs activities of apprentices and associate tradespersons.	knowledge of general type of work to be done	
		knowledge of subtrades and schedules	
		knowledge of contract needs	
		ability to assess skills	
		ability to interpret drawings and written instructions	
		ability to communicate orally and in writing	
		ability to establish and maintain effective working relationships with superiors, subordinates and associate workers	
		ability to govern self and others with regard to punctuality, tact, honesty and reliability	
		ability to find out exactly what must be done and how it is to be done	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

Task 39 Installs, repairs/maintains, assembles/disassembles and tests tube bundles.

Trend: Towards the use of more technologically advanced equipment.

	Sub-tasks	Enabling Objectives	Tools & Equipment
39.01	Isolates exchanger or	knowledge of where to acquire work permit	drawings,

	Sub-tasks	Enabling Objectives	Tools & Equipment
	cooler to be disassembled.	ability to read and interpret drawings and specifications	specifications, paper, pencil

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.02	Isolates and gas tests the unit.	ability to blank off incoming and outgoing piping ability to read and interpret drawings ability to operate hand tools ability to lift, climb and carry	personal safety equipment, wrenches, hammer, flange spreader, blind flanges, gas testing equipment (operator controlled)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.03	Removes channel head.	knowledge of choosing and attaching tube bundle to pulling devices ability to remove channel head with cover, shell cover (derby), floating head cover and backing rings ability to operate hand tools ability to lift, climb and carry	eyebolts, set of pull rods, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.04	Attaches tube bundle-pulling devices.	knowledge of methods of choosing and attaching tube bundle, pulling	eyebolts, set of pull

	Sub-tasks	Enabling Objectives	Tools & Equipment
		devices and hydraulic bundle extractors ability to operate hand tools ability to lift, climb and carry	rods, wrenches, bundle extractor

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.05	Removes tube bundles.	knowledge of sequence of events required to perform operation knowledge of rigging knowledge of crane signals ability to measure ability to operate hand tools ability to operate a bundle extractor	personal safety equipment, crane, wire rope slings, synthetic web slings, rigging hardware, cribbing, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.06	Cleans tube bundles.	knowledge of procedures for high-pressure washing knowledge of manual and automated cleaning equipment knowledge of safety requirements	high-pressure washing equipment, personal safety equipment, hammer, chisels, wire brush, turbine cleaning equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
39.07	Prepares and repairs shell components for tube bundle installation.	knowledge of cleaning and preparation of surfaces, studs and bolts knowledge of repair procedures knowledge of hazards ability to operate hand tools ability to lift, climb and carry	personal protective equipment, wire wheel grinder, wire brush, spatulas, rags, doping compound, paint brushes

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

39.08	Installs inspected tube bundles.	knowledge of sequence of events required to perform operation knowledge of rigging knowledge of crane signals ability to operate hand tools ability to measure	personal safety equipment, crane, synthetic web slings, rigging hardware, blocking, gasket(s), gasket compound

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

39.09	Reassembles unit.	knowledge of sequence of events required to perform operation knowledge of bolt tightening sequence knowledge of bolt tensioning equipment	eyebolts, set of pull rods, wrenches, gaskets, gasket compound, bolt tensioning equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.10	Tests for leaks (tube side).	knowledge of sequence of events required to perform operation knowledge of action to be taken if there is a pressure drop or evident visible leaks ability to set up testing equipment, blank off channel head nozzles, fill and test tube side ability to operate hand tools	personal safety equipment, testing unit, wrenches, fittings, gauges, air supply, water supply, flange spreaders

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.11	Reassembles shell cover (derby).	knowledge of sequence of events required to perform operation knowledge of bolt tightening sequence ability to operate hand tools	eyebolts, set of pull rods, wrenches, gaskets, gasket compound

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.12	Tests for leaks (shell side).	knowledge of sequence of events required to perform operation	personal safety equipment, testing unit, wrenches, fittings, gauges, air supply,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of action to be taken if there is a pressure drop or evident visible leaks	water supply, flange spreaders
		ability to set up testing equipment, blank off channel head nozzles, fill and test tube side	
		ability to operate hand tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

39.13	Prepares unit for service.	ability to read and interpret drawings	personal safety equipment, wrenches, hammer, flange spreaders, gaskets, gasket compound, broom, shovel, trash bin
		ability to remove blind flanges and prepare incoming and outgoing piping	
		ability to operate hand tools	
		ability to lift, climb and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 40 **Installs, removes and expands tubes in boilers, heat exchangers and related equipment.**

Trend: Towards more technologically advanced equipment and more use of exotic metals (alloys).

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.01	Interprets drawings and specifications.	knowledge of abbreviations, symbols, reference points and terminology	drawings, specifications, pencil, paper, tube expanding tables and

Sub-tasks	Enabling Objectives	Tools & Equipment
	ability to read and interpret drawings and specifications	measurements, ASME codes
	knowledge of terminology and nomenclature of components of heat exchangers, boilers and their purpose	
	knowledge of special precautions and techniques required for safe removal, replacement and handling of tube bundles	
	knowledge of use of various lifting and pulling mechanisms	
	knowledge of testing procedures used to detect leaks	
	knowledge of various tube cleaning methods	
	knowledge of procedures and techniques used in removal and replacement of gaskets	
	knowledge of bolting procedures for heat exchangers	
	knowledge of common causes of performance failures in heat exchangers	
	knowledge of specific sequences according to specifications for various units	
	knowledge of various types of heat exchangers and their function and application	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.02	Checks tube for correct specification.	knowledge of various types of tubes	project specifications

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

40.03	Measures and records inside diameter of tube seats.	knowledge of use of inside callipers and reading of inside and/or outside micrometers knowledge of components ability to select tools ability to measure	callipers, micrometers, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.04	Measures and records outside diameter of tube.	knowledge of use and reading of micrometers knowledge of components ability to select tools ability to measure	micrometers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.05	Calculates amount of expansion required.	knowledge of method of calculating expansion for various types and sizes of tubes and tube seats	reference tables, calculator

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to calculate	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

40.06	Cleans inside and outside of tube ends.	knowledge of standards of cleanliness for tube rolling ability to operate hand tools	goggles, safety glasses, wire brush, abrasive paper, liquid cleaner, wiping cloths

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.07	Cleans and dries tube seats.	knowledge of methods and procedures ability to operate hand tools	goggles, safety glasses, spiral brush, drill, extension cord, pencil sharpener

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.08	Inserts tubes into tube hole.	knowledge of ASME code regarding tolerance ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.09	Secures tubes to eliminate possibility of rotation.	knowledge of method(s) for preventing tube rotation	tube clamps

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to attach tube clamps	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.10	Lubricates inside of tubes.	knowledge of appropriate techniques and materials ability to apply lubricant	water soluble lubrication, brush, applicator

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.11	Inserts assembled mandrel and expander into tubes.	knowledge of sequence of operation knowledge of use of mandrel and expander body for tube size, wall thickness and tube seat width ability to select correct equipment ability to operate expander	tube expander set

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.12	Ensures good contact between rollers, mandrel and tubes.	knowledge of prerolling knowledge of how to tap mandrel with hammer to cause solid contact ability to operate hand tools	ball-peen hammer, rolls, mandrel

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.13	Operates driving mechanism.	knowledge of operation of air and power actuated tools knowledge of correct rotation knowledge of methods of attaching drive mechanism to mandrel knowledge of expansion process required ability to set torque requirements, if necessary ability to operate drive mechanism ability to operate hand tools	wrenches, air or power actuated tools, come-alongs, tube lipping tool, flaring tool

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.14	Removes mandrel and rolls.	knowledge of rolling techniques knowledge of equipment knowledge of method ability to rotate mandrel in counterclock wise direction ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
40.15	Measures inside diameter of expanded tubes.	knowledge of specifications and measuring devices ability to measure	internal dial gauge, callipers

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to calculate amount of expansion ability to select correct tools	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.16	Repeats expanding operation, if required.	knowledge of expanding operation	internal dial gauge, callipers, micrometers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.17	Cleans mandrel and rolls thoroughly.	knowledge of need for cleaning ability to perform cleaning operations	rags, cleaning agents

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

40.18	Removes tubes.	knowledge of abbreviations, symbols, reference points and terminology knowledge of terminology and nomenclature of components of heat exchangers, boilers and their purpose knowledge of special precautions and techniques for safe removal, replacement and handling of tubes	drawings, specifications, pencil, paper, tube expanding tables and measurements, ASME codes, callipers (including internal callipers), micrometers, measuring tape, reference tables, calculator, goggles, tube clamps, water soluble lubricant, brush, applicator, ball-

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of use of various lifting and pulling mechanisms	peen hammer, wrenches, air or power actuated tools, come-alongs, rags, cleaning agents, arc-air gouger, cutting torch, jackhammer, fly cutter, hydraulic removal equipment, welding machine, air compressor and hoses, air movers
	knowledge of specific sequences according to specifications for various units	
	knowledge of various types of heat exchangers and their function and application	
	ability to read and interpret drawings and specifications	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 41 Installs, repairs/maintains, assembles/disassembles and demolishes component parts of boilers.

Trend: Toward larger and heavier sections being handled (completed units).

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.01	Reviews drawings and specifications for orientation.	knowledge of scope and purpose of project	drawings, specifications
		knowledge of working space available	
		knowledge of locations of materials	
		knowledge of availability of outlets for welding machines	
		knowledge of layouts of foundations	
		knowledge of erection procedures and sequence	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of availability of derricks, cranes, tuggers, rigging equipment and tools knowledge of arrangements for first aid, drinking water and sanitary facilities knowledge of methods used to assemble and fit components, such as steam and mud drums, headers, tubes, refractories, air ducts, fans, condensers, stacks, breaching, burners, precipitators, pulverizers, ashpits, superheaters and economizers knowledge of procedure to remove components ability to read and interpret drawings and specifications	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

41.02	Determines size, weight and location of steam drum.	knowledge of calculation of weight to identify rigging requirements ability to read and interpret drawings ability to calculate	drawings, specifications, calculator, paper, pencil

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

41.03	Inspects building and determines work area.	knowledge of methods of installing components, shoring, falseworks,	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		scaffolds and adding reinforcements to structures knowledge of work site knowledge of work schedules	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.04	Prepares work site.	knowledge of methods of installing components, shoring, falseworks, scaffolds and adding reinforcements to structures knowledge of methods of preparing for hoisting, lowering or horizontal movement by reinforcing or strengthening structure or by installing shoring and falsework ability to operate hand and power tools ability to lift, climb and carry	scaffolds, shoring, platforms, wrenches, hoisting equipment, rigging equipment, lumber, hammer, nails, plate, bar and other configurations of steel, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.05	Selects hoisting equipment.	knowledge of size, weight and location of equipment to be hoisted knowledge of hoisting equipment knowledge of job and local requirements	derricks, cranes (overhead, stationary, mobile, tower, boom truck), air pole, Chicago boom, guy derrick, high lines, stiff-leg device, gantry hoist

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.06	Selects rigging equipment.	knowledge of advantages and disadvantages of different equipment	wipe rope, nylon rope, cable clips, shackles, turnbuckles, spreaders, chokers, jacks, lifting bars, rollers, dollies, chain blocks, come-alongs

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.07	Attaches rigging equipment to drum and hoisting equipment.	knowledge of techniques for attaching rigging equipment knowledge of locating and erecting hoisting equipment ability to operate hand and power tools	rigging devices, wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.08	Directs movement of drum to desired location.	knowledge of rigging and hoisting equipment, techniques and practices knowledge of signals knowledge of radios or other communication devices ability to co-ordinate and communicate with other members of the installation team, such as riggers, fitters, connectors and hoisting operators	radios

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.09	Secures drum temporarily.	knowledge of techniques for restraining heavy objects knowledge of hazards of losing control of heavy objects ability to secure drum pending installation of permanent suspension	lifting devices, rope, cables, cable clamps, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.10	Attaches rigging equipment to U-bolts.	knowledge of rigging hardware ability to select and apply necessary hardware	slings, shackles, tugger, wrenches, cable clamps

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.11	Places U-bolts on drum.	knowledge of hoisting signals ability to direct bolts into ends of drum and into structural steel	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.12	Attaches washers and nuts to U-bolts.	knowledge of washer and nut arrangement ability to operate hand tools ability to lift and carry	safety belts, harnesses, lanyards, lifelines, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.13	Directs movement of drum into exact location.	knowledge of rigging and hoisting equipment, techniques and practices knowledge of signals knowledge of radios or other communication devices ability to co-ordinate and communicate with other members of the installation team, such as riggers, fitters, connectors and hoisting operators	level, transit, radios

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.14	Removes rigging and hoisting devices from steam drum.	knowledge of safe removal procedures ability to operate hand and power tools	wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.15	Installs mud drum support rods into steam drum.	knowledge of methods of setting up tuggers and lead lines knowledge of methods of rigging rods knowledge of methods of attachment to drum	tugger, hoisting devices, wrenches, impact wrenches, rigging equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.16	Selects and installs swing stages or bosun's chairs.	knowledge of various types of swing stages and their installation methods, reeving methods and lashing techniques ability to lift, climb and carry ability to operate hand tools	chain block hoist, lifelines, wrenches, clamps

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.17	Selects and fastens hoisting blocks to each end of steam drum.	knowledge of lashing techniques and drum rigging required knowledge of hoisting blocks knowledge of signals ability to install rigging equipment	selection of wire rope, wire rope clips, wrenches, shackles, wire rope blots, snatch blocks, chokers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.18	Directs positioning of mud drum.	knowledge of drum handling techniques knowledge of signals knowledge of when to raise and lower mud drum ability to give signals	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.19	Attaches lower hoisting blocks to mud drum ends.	knowledge of lashing techniques and drum rigging required knowledge of hoisting blocks knowledge of signals ability to install rigging equipment	selection of wire rope, wire rope clips, wrenches, shackles, wire rope blots, snatch blocks, chokers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.20	Inserts drum support rods into mud drum.	ability to read and interpret drawings ability to line up support rods ability to lift and carry	hoisting equipment, rigging equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.21	Inserts tack tubes into steam drum.	knowledge of tube installation specifications ability to read and interpret drawings ability to give signals ability to lift and carry	hoisting equipment, rigging equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
41.22	Expands tack tubes in steam drum.	knowledge of tube expansion methods, equipment and techniques ability to operate expanding equipment	rolling and expanding tools	yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND
41.23	Inserts tack tubes into mud drum holes.	knowledge of proper sequences of installation and vibration of tack and generating tubes ability to operate hand tools	hammer, wedges, shims, clamps, spacers	yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND
41.24	Raises mud drum in small increments using rigging.	knowledge of rigging techniques knowledge of hoisting signals ability to give signals	hoisting equipment, rigging blocks, slings, shackles	yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND
41.25	Installs remainder of tubes.	knowledge of tube installation techniques knowledge of hoisting signals ability to give signals	hoisting equipment, rigging equipment	yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.26	Takes up slack in support rods.	knowledge of procedure ability to operate hand tools	wrenches, hammer, bolts and nuts, tube tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.27	Installs wooden spacers, strong backs and clamps.	knowledge of basic trade procedures ability to operate hand and power tools ability to lift and carry	wrenches, impact wrenches, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.28	Removes mud drum support rods.	knowledge of ASME standards and specifications ability to operate hand and power tools ability to lift and carry	wrenches, impact wrenches, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.29	Expands tubes in mud drum in proper sequence.	knowledge of tube expansion methods, equipment and techniques ability to operate expanding equipment	tube expanding tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.30	Checks alignment of drums.	knowledge of job requirements ability to use transit ability to use survey instruments ability to measure	transit, level, measuring tape, survey instruments

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.31	Removes mud drum lifting rigging.	knowledge of safe removal procedures ability to operate hand and power tools ability to lift and carry	wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.32	Installs structural support steel.	knowledge of methods of raising and connecting structural ironwork knowledge of sequence of installing structural members previously omitted to permit installation of steam and mud drums	connecting bars, pins, bolts, wrenches, drift pins, plumb bob, squares, survey instruments

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.33	Installs catwalks and stairways.	knowledge of rigging techniques knowledge of hoisting signals	hoisting equipment, rigging equipment, water level, layout

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of methods of installing and fastening ability to weld ability to operate hand and power tools ability to lift and carry ability to give signals	tools, welding machine, wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.34	Raises and installs headers, as required.	knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to operate hand and power tools ability to lift and carry ability to give signals	hoist, slings, blocks and rigging hardware, wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.35	Installs and expands tube connectors to headers and components.	knowledge of basic trade procedures for assembly ability to read and interpret drawings	tube rolling equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of tube expansion methods, equipment and techniques ability to operate expanding equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.36	Installs super- heaters, reheaters, economizers and related tubing.	knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to weld ability to operate hand and power tools ability to lift and carry ability to give signals	crane, tugger, chain block hoist, come-alongs, welding equipment, wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.37	Erects and fits upper wall membrane panels to headers.	knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to weld ability to measure	crane, tugger, chain block hoist, come-alongs, welding equipment, wrenches, impact wrenches, measuring tape

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate hand and power tools ability to lift and carry ability to give signals	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.38	Assembles and installs swing staging.	knowledge of various types of swing stages and their installation methods, reeving methods and lashing techniques ability to lift, climb and carry ability to operate hand tools	chain block hoist, lifelines, wrenches, clamps

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.39	Attaches lifting and rigging devices to wall section.	knowledge of rigging required knowledge of advantages and disadvantages of different equipment ability to attach equipment ability to lift and carry ability to operate hand and power tools	wipe rope, nylon rope, cable clips, shackles, turnbuckles, spreaders, chokers, jacks, lifting bars, rollers, dollies, chain blocks, come-alongs

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.40	Fits lower wall membrane panels to top panels.	knowledge of safety precautions as well as working and lifting techniques when working from swing stages knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to weld ability to measure ability to operate hand and power tools ability to lift and carry ability to give signals	chain block hoist, tugger, wrenches, hammer, stickers, dollies, bars, wedges, shims, gauges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.41	Fits tubes in proper sequence.	knowledge of welding clearances and tolerances knowledge of methods of installing and fastening ability to weld ability to measure ability to operate hand and power tools ability to lift and carry	welding machine, hammer, wedges, bars

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to align tubes to exact clearance for welding ability to communicate and direct teams of boilermakers and welders working on each side of wall tubes	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.42	Installs air ducts, flues, fans and air heaters.	knowledge of fabrication methods for steel auxiliary plant equipment in accordance with design requirements knowledge of methods of installing and fastening ability to read and interpret drawings and specifications ability to weld ability to measure ability to operate hand and power tools ability to lift and carry	crane, tugger, chain block hoist, come-alongs, welding equipment, wrenches, impact wrenches, measuring tape, hammer, chisels, grinder, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

41.43	Assembles and installs hoppers and tanks.	knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening	crane, tugger, chain block hoist, come-alongs, welding equipment, wrenches, impact wrenches, measuring tape,

Sub-tasks	Enabling Objectives	Tools & Equipment
	ability to read and interpret drawings and specifications ability to weld ability to measure ability to operate hand and power tools ability to lift and carry ability to give signals	hammer, chisels, grinder, welding equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Sub-tasks	Enabling Objectives	Tools & Equipment
41.44 Assembles, fits and installs boiler face.	knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to read and interpret drawings and specifications ability to weld ability to measure ability to operate hand and power tools ability to lift and carry ability to give signals	crane, tugger, chain block hoist, come-alongs, welding equipment, grinder, wrenches, impact wrenches, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.45	Assembles, fits and installs heating components.	knowledge of layout methods knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to read and interpret drawings and specifications ability to weld ability to measure ability to operate hand and power tools ability to lift and carry ability to give signals	crane, tugger, chain block hoist, come-alongs, welding equipment, grinder, wrenches, impact wrenches, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
41.46	Removes, repairs and maintains component parts of boiler.	knowledge of scope and purpose of project knowledge of working space availability knowledge of locations of materials knowledge of availability of outlets for welding machines knowledge of safe removal procedures and sequence	drawings, specifications, calculator, paper, pencil, scaffolds, shoring, platforms, wrenches, hoisting equipment, rigging equipment, lumber, hammer, nails, plate, bar and other configurations of steel, welding equipment, derrick, cranes (overhead, stationery, mobile, tower), guy derrick, high lines,

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of availability of derricks, cranes, tuggers, rigging equipment and tools knowledge of arrangements for first aid, drinking water and sanitary facilities knowledge of methods used to assemble and take out components, such as steam and mud drums, headers, tubes, refractories, air ducts, fans, condensers, stacks, breaching, burners, precipitators, pulverizers, ashpits, superheaters and economizers knowledge of calculations of weight to identify rigging requirements knowledge of methods of installing components, shorings, falseworks, scaffolds and aiding reinforcements to structures knowledge of work site knowledge of work schedules knowledge of methods of preparing for hoisting, lowering or horizontal movement by reinforcing or strengthening structures or by installing shoring and falsework knowledge of size, weight and location of equipment to be hoisted knowledge of job and local requirements knowledge of advantages and disadvantages of different equipment	stiff-leg device, gantry hoist, nylon rope, cable clips, shackles, turnbuckles, spreaders, chokers, jacks, lifting bars, rollers, dollies, chain blocks, come-alongs, impact wrenches, communication radios, cables, slings, tugger, safety belts, safety harnesses, lanyards, lifelines, selection of wire rope, snatch blocks, rolling and expanding tools, spacers, shims, wedges, bolts and nuts, tube tools, transit, level, measuring tape, connecting bars, pins, drift pins, plumb bob, squares, survey instruments, water level, layout tools, welding machine

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of techniques for attaching rigging equipment	
	knowledge of locating and erecting hoisting equipment	
	knowledge of rigging and hoisting equipment, techniques and practices	
	knowledge of signals	
	knowledge of radios or communication devices	
	knowledge of techniques for restraining heavy objects	
	knowledge of hazards of losing control with heavy objects	
	knowledge of methods of setting up tuggers and lead lines	
	knowledge of lashing techniques and drum rigging required	
	knowledge of hoisting blocks	
	knowledge of tube removal methods, equipment and techniques	
	knowledge of basic trade procedures	
	knowledge of ASME standards and specifications	
	knowledge of survey instruments	
	knowledge of methods of raising, lowering and connecting/ disconnecting structural ironwork	
	knowledge of methods of installing and fastening	

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of basic trade procedures for disassembly	
	knowledge of various types of swing stages and their installation methods, reeving methods and lashing techniques	
	knowledge of safety precautions as well as working and lifting techniques when working from swing stages	
	knowledge of fabrication methods for steel auxiliary plant equipment in accordance with design requirements	
	knowledge of layout methods	
	ability to read and interpret drawings and specifications	
	ability to calculate	
	ability to operate hand and power tools	
	ability to lift, climb and carry	
	ability to co-ordinate and communicate with other members of the dismantling team, such as riggers, fitters, connectors and hoisting operators	
	ability to use a transit	
	ability to measure	
	ability to weld	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 42 **Installs, repairs/maintains, assembles/disassembles and demolishes bottom supported boilers.**

Trend: New technology in the area of waste disposal and ecology is creating more necessity for these boilers.

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.01	Unloads equipment and material.	knowledge of use and purpose of hoisting and rigging devices knowledge of materials control knowledge of co-ordination of the off-loading ability to lift, climb and carry ability to follow manufacturers' recommendations ability to operate hand tools	crane, chokers, tag lines, slings, shackles, hand lines, hand wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.02	Positions mud drum.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to operate hand and power tools	crane, chokers, tag lines, wrenches, impact wrenches, measuring tape

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to measure ability to lift and carry ability to give signals	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.03	Mounts pedestals on mud drum.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to attach guylines to pedestals to stabilize them ability to operate hand and power tools ability to lift and carry ability to give signals	crane, chokers, tag lines, wrenches, impact wrenches, measuring tape

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.04	Mounts steam drum on pedestals.	knowledge of purpose and structure of components	crane, chokers, tag lines, wrenches, impact wrenches, measuring tape

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to operate hand and power tools ability to lift and carry ability to give signals	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.05	Stabs generator section.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening ability to operate hand and power tools ability to lift and carry ability to give signals	crane, chokers, tag lines, wrenches, pettibone, tugger, lead hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.06	Rolls off the generating section.	knowledge of techniques of rolling off generating section knowledge of purpose and structure of components ability to operate hand and power tools ability to lift and carry ability to give signals	lead hammer, Lair motor, rolling gear

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.07	Removes pedestals.	knowledge of how to unbolt pedestals from steam drum and mud drum in order to move pedestals off-site knowledge of rigging techniques knowledge of hoisting signals ability to operate hand and power tools ability to lift and carry ability to give signals	crane, chokers, tag lines, wrenches, impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.08	Installs back wall.	knowledge of purpose and structure of components	crane, 5 ton chain block hoist, come-alongs, chokers, tag lines, pettibone

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening knowledge of how to hang back wall using come-alongs and chain block hoists ability to operate hand and power tools ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.09	Installs side walls.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening knowledge of how to hang side walls from structural steel using chain block hoists and come-alongs ability to operate hand and power tools	crane, 5 ton chain block hoist, come-alongs, chokers, tag lines, pettibone

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.10	Installs front wall.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening knowledge of how to hang front wall from structural steel using chain block hoists and come-alongs ability to operate hand and power tools ability to lift and carry	crane. 5 ton chain block hoist, come-alongs, chokers, tag lines, pettibone

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.11	Installs bullnose.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals	crane, chain block hoist, come-alongs, chokers, tag lines

Sub-tasks		Enabling Objectives	Tools & Equipment
		knowledge of methods of installing and fastening knowledge of how to hang inside boiler from header using chain block hoists and come-alongs ability to operate hand and power tools ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.12	Welds walls and bullnose in place.	knowledge of welding code requirements ability to read and interpret drawings and specifications ability to weld all platen splits	welding machine, goggles, gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.13	Installs roof.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening	crane, chokers, tag lines, come- alongs, chain block hoist

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of how to hang roof walls from structural steel using chain block hoists and come-alongs ability to operate hand and power tools ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.14	Installs economizer module.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of rigging techniques knowledge of hoisting signals knowledge of methods of installing and fastening knowledge of how to hang module from structural steel using chain block hoists and come-alongs ability to position and weld unit to structural steel ability to position and weld feeder tubes ability to weld feeder tubes to mud drum ability to operate hand and power tools	crane, chokers, tag lines, chain block hoist, pettibone, welding equipment, goggles, gloves

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.15	Installs ash hopper.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of methods of installing and fastening ability to position and weld unit to economizer ability to operate hand and power tools ability to lift and carry	come-alongs, wrenches, welding equipment, goggles, gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
42.16	Installs breaching for forced draft fan (FD) and induced draft fan (ID).	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of methods of installing and fastening ability to operate hand and power tools ability to lift and carry	crane, chokers, come-alongs, welding equipment, goggles, gloves, wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to weld to structural steel ability to bolt components to fan	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.17	Connects boiler exhaust breaching to antipollution system.	knowledge of purpose and structure of components ability to read and interpret drawings and specifications knowledge of methods of installing and fastening ability to operate hand and power tools ability to lift and carry ability to weld to antipollution system	crane, come-alongs, chokers, welding equipment, goggles, gloves, wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

42.18	Removes, repairs and maintains component parts of bottom supported boilers.	knowledge of scope and purpose of project knowledge of working space availability knowledge of locations of materials knowledge of availability of outlets for welding machines knowledge of safe removal procedures and sequence	drawings, specifications, calculator, paper, pencil, scaffolds, shoring, platforms, wrenches, hoisting equipment, rigging equipment, lumber, hammer, nails, plate, bar and other configurations of steel, welding equipment, derricks, cranes

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of availability of derricks, cranes, tuggers, rigging equipment and tools	(overhead, stationary, mobile, tower) guy derrick, high lines, stiff-leg device, gantry hoist, nylon rope, cable clips, shackles, turnbuckles, spreaders, chokers, jacks, lifting bars, rollers, dollies, chain blocks, come-alongs, impact wrenches, communication radios, cables, slings, tugger, safety belts, safety harnesses, lanyards, lifelines, selection of wire rope, snatch blocks, rolling and expanding tools, spacers, shims, wedges, bolts and nuts, tube tools, transit, level, measuring tape, connecting bars, pins, drift pins, plumb bob, squares, survey instruments, water level, layout tools, personal protective equipment
	knowledge of arrangements for first aid, drinking water and sanitary facilities	
	knowledge of methods used to assemble and take out components, such as steam and mud drums, headers, tubes, refractories, air ducts, fans, condensers, stacks, breaching, burners, precipitators, pulverizers, ashpits, superheaters and economizers	
	knowledge of calculations of weight to identify rigging requirements	
	knowledge of methods of installing components, shorings, falseworks, scaffolds and aiding reinforcements to structures	
	knowledge of work site	
	knowledge of work schedules	
	knowledge of methods of preparing for hoisting, lowering or horizontal movement by reinforcing or strengthening structures or by installing shoring and falsework	
	knowledge of size, weight and location of equipment to be hoisted	
	knowledge of job and local requirements	
	knowledge of advantages and disadvantages of different equipment	

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of techniques for attaching rigging equipment	
	knowledge of locating and erecting hoisting equipment	
	knowledge of rigging and hoisting equipment, techniques and practices	
	knowledge of signals	
	knowledge of radios or communication devices	
	knowledge of techniques for restraining heavy objects	
	knowledge of hazards of losing control with heavy objects	
	knowledge of methods of setting up tuggers and lead lines	
	knowledge of lashing techniques and drum rigging required	
	knowledge of hoisting blocks	
	knowledge of tube removal methods, equipment and techniques	
	knowledge of basic trade procedures	
	knowledge of ASME standards and specifications	
	knowledge of survey instruments	
	knowledge of methods of raising, lowering and connecting/ disconnecting structural ironwork	
	knowledge of methods of installing and fastening	

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of basic trade procedures for disassembly	
	knowledge of various types of swing stages and their installation methods, reeving methods and lashing techniques	
	knowledge of safe precautions as well as working and lifting techniques when working from swing stages	
	knowledge of fabrication methods for steel auxiliary plant equipment in accordance with design requirements	
	ability to read and interpret drawings and specifications	
	ability to calculate	
	ability to operate hand and power tools	
	ability to lift, climb and carry	
	ability to co-ordinate and communicate with other members of the dismantling team, such as riggers, fitters, connectors and hoisting operators	
	ability to use a transit	
	ability to measure	
	ability to weld	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 43 **Receives, prepares, repairs/maintains, assembles/disassembles, demolishes, stores and installs precipitator components.**

Trend: Towards design changes that allow for installations of large prefabricated sections, e.g. panels of collection plates instead of individual collection plates and pre-assembly of precipitators into modules for tidewater construction sites. Design and material changes are resulting in more efficient installation and less wear and frequency of repairs.

	Sub-tasks	Enabling Objectives	Tools & Equipment
43.01	Stores precipitator components for sequential retrieval.	knowledge of drawings, construction schedules, materials, tools and parts lists knowledge of procedures required to arrange components in a manner which allows sequential retrieval knowledge of procedures used to select and set-up crane(s) to handle precipitator parts knowledge of procedures required to rig components from trucks, rail cars, barges and other forms of transport knowledge of appropriate location in laydown yard knowledge of selection of tools and equipment for precipitator erection knowledge of rigging procedures and signals ability to catalogue equipment and material	crane(s), slings, shackles, drawings, material and equipment lists, construction schedules, dunnage/cribbing, rigging belts, safety belts, lanyards, wrenches, hand lines, pry and wrecking bars, measuring tape, personal safety equipment (hard hat, safety glasses and steel toe boots), pen or pencil, paper

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
43.02	Prepares and assembles components prior to installation.	knowledge of methods of preparation knowledge of welding codes knowledge of manufacturers' specifications knowledge of drawings and material lists knowledge of construction schedules and erection sequence knowledge of procedures used to repair parts and components damaged in transit knowledge of pre-assembly of high tension frames, if required ability to weld ability to lift and carry ability to operate hand and power tools	wrenches (crescent, socket, combination types), measuring tape, hammer, squares, level, welding equipment, oxy-acetylene cutting equipment, air compressor and hoses, grinder, drawings, material lists, crane, slings, shackles

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

43.03	Installs and erects precipitator roof, shell, bottom and components.	knowledge of rigging, fitting and welding procedures to install roof and shell plates, stairways, platforms and ladders knowledge of drawings knowledge of appropriate welding codes knowledge of construction schedules	welding equipment, oxy-acetylene cutting equipment, air compressor and hoses, crane(s), slings and shackles, monorails, electric/air tuggers, chain block hoist, Tirfors, come-alongs, hydraulic jacks, shims, cribbing/dunnage,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of procedures used to install and operate various types of rigging equipment knowledge of terminology and purpose of components (wet or dry flat bottom, hopper bottom, access stairways, platforms and ladders ability to fit and align inlets and outlets	ball-peen hammer, hammer, dogs and wedges, pry and wrecking bars, centre punch, squares, spirit level, chalk lines, plumb bob, transit, staging planks and brackets, ladders, safety lines, electric panel box, extension cords, electric lighting, grinder, crescent wrenches, combination wrenches, socket wrenches, pipe wrenches, Allen wrenches, measuring tape, soapstone, air manifold, screwdrivers

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

43.04	Installs through fittings.	knowledge of procedures for rigging and fitting a variety of appurtenances, fixtures and through fittings knowledge of drawings, construction schedules and material lists knowledge of the appropriate welding codes used to determine welding procedures knowledge of signals ability to give signals	welding equipment, oxy-acetylene cutting equipment, air compressor and hoses, crane(s), slings, shackles, electric or air tuggers, chain block hoist, Tirfors, come-alongs, hydraulic jacks, shims, dogs and wedges, ball-peen hammer, pry and wrecking bars, centre punch, squares, spirit level, chalk lines, plumb bob, transit, staging planks, staging brackets and clips,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate hand and power tools ability to weld high voltage supports and systems, insulator compartments, collecting and discharge rapper support, fixtures, manway accesses, transformers and rectifier boxes	ladders, salines, electric panel box, extension cord, electric lighting, grinder, crescent and combination wrenches, socket wrenches, pipe wrenches, Allen wrenches, screwdrivers, measuring tape, soapstone, air manifold

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

43.05	Welds or bolts high-voltage frames and other components.	knowledge of procedures required by individual design of rigging and fitting high voltage systems into position knowledge of drawings, construction schedules and material lists knowledge of procedures used to bolt and/or weld high voltage systems according to appropriate codes and manufacturers' recommendations ability to identify plate hanger bolts, plate anvil beams, plate spacer bars, wire support angles, discharge electrodes, lower steadying frames and collecting plates	crane(s), air or electric tuggers, slings and shackles, pry and wrecking bars, crescent and combination wrenches, socket wrenches, pipe wrenches, Allen wrenches, screwdrivers, air compressor and hoses, air manifold, air impact wrench, Tirfors, come-alongs, chain block hoist, spirit level, plumb bob, chalk lines, drop or single sieve blocks

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

43.06	Aligns high voltage collection and discharge system components.	knowledge of drawings	drawings, specifications, plumb bob, string lines, hand

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of procedures used to align components of the high voltage system according to manufacturers' specifications knowledge of appropriate welding codes ability to weld ability to operate hand and power tools ability to measure and lay out	wrenches, impact wrenches, socket wrenches, pipe wrenches, welding equipment, oxy-acetylene cutting equipment, eye protection, gloves

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	no	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
43.07	Welds or bolts rappers, drive shafts and hammers.	knowledge of procedures used to install and align rappers, drive shafts and hammers, according to manufacturers' specifications knowledge of drawings knowledge of appropriate welding codes ability to weld ability to operate hand and power tools ability to measure and lay out	pry and wrecking bars, crescent and combination wrenches, socket wrenches, pipe wrenches, welding equipment, string lines, level, come-alongs, chain block hoist, air or electric tuggers, chokers and shackles, ball-peen hammer, hammer, electric panel box, extension cord and lighting

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
43.08	Completes installation of all accessories and components.	knowledge of procedures used to complete installation of precipitator components knowledge of appropriate welding codes knowledge of torque pressures and bolting sequences ability to complete installation of shell, roof or bottom plates omitted to allow installation of high voltage system ability to install dampers, mandoors, angers, agitator arms for wet bottoms, handrails or any other part as required by individual design	crescent and combination wrenches, socket wrenches, Allen wrenches, screwdrivers, soapstone, spirit levels, squares, centre punch, ball-peen hammer, hammer, welding equipment, oxy-acetylene cutting equipment, grinder, electric panel boxes, extension cord and lighting, pry and wrecking bars, come-alongs, chain block hoist, air or electric tuggers, crane(s), chokers and shackles, air compressor and hoses, air manifold, air impact wrenches

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

43.09	Removes, repairs and maintains precipitator components.	knowledge of drawings, construction schedules, materials, tools and parts list knowledge of procedures required to disassemble components knowledge of procedures used to store disassembled components knowledge of procedures used to install and operate various types of rigging equipment knowledge of terminology and purpose of components	crane(s), slings, drawings, material and equipment lists, repair or dismantling schedules, cribbing, rigging belts, safety belts and harnesses, lanyards, wrenches, hand lines, pry and wrecking bars, chokers and shackles, come-alongs, welding equipment, gloves, goggles, measuring tape, pen or pencil, paper, oxy-acetylene

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of signals knowledge of procedures used to complete the dismantling of precipitator components knowledge of personal safety equipment ability to weld ability to lift and carry ability to operate hand and power tools ability to give signals ability to identify plate hanger bolts, plate anvil beams, plate spacer bars, wire support angles, discharge electrodes, lower steadying frames and collecting plates ability to measure and lay out	cutting equipment, air compressor and hoses, monorails, electric/air tuggers, chain block hoist, Tirfors, hydraulic jacks, shims, hammer, ball-peen hammer, dogs and wedges, staging planks and brackets, ladders, safety lines, extension cords, electric lighting, grinder, soapstone, air manifold, screwdrivers, Allen wrenches, pipe wrenches, impact wrenches, rigging equipment, eye protection, gloves, personal safety equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 44 **Prepares/fabricates, repairs/maintains, assembles/disassembles, demolishes and installs stacks, towers and furnaces.**

Trend: No apparent change.

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.01	Establishes a laydown yard.	knowledge of stacks, towers, furnaces and related equipment	pencil, paper

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to interpret drawings, flow charts and/or construction schedules, material and tool lists as well as area maps	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	no	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.02	Receives and sets up lifting and hoisting equipment, including boom assembly, if required.	knowledge of use and purpose of hoisting and rigging devices knowledge of lifting, hoisting and rigging equipment set-up techniques ability to lift, climb and carry ability to follow manufacturers' recommendations ability to operate hand and power tools	crane, slings, shackles, hand lines, hammer, pry bar, hand wrenches, rigging belts, impact wrenches, jacking systems

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.03	Lays out sections or components for sequential use.	knowledge of construction schedules knowledge of methods of off-loading large components knowledge of signals knowledge of hoisting equipment and rigging procedures and techniques	crane(s), slings, shackles, hand lines, dunnage/cribbing, spud and hand wrenches

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to place sections or components in order of use	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

44.04	Prepares sections or components for installation, including subassembly, if required.	knowledge of methods of repairing damage done in transit knowledge of material preparation, such as installing lifting lugs and removal of protective coatings knowledge of techniques and methods of assembling component parts prior to installation at site ability to read and interpret drawings ability to operate a wide range of hand and power tools safely	welding equipment, oxy-acetylene cutting equipment, hydraulic jacks, dogs and wedges, hammer, measuring tape, level, squares, pry bar, crane(s), slings, shackles, pre- heating torches, rags, solvents and cleaners, grinding and buffing tools, hand lines, eye protection, mask, protective clothing and equipment, electric tools, air power tools

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

44.05	Prepares site for installation.	ability to read and interpret drawings and specifications knowledge of installation techniques for erecting staging platforms knowledge of efficient disbursement of tools and equipment knowledge of preparation of pedestal bolts, if any	crane(s), slings, shackles, die nuts, hand, crescent and socket wrenches, ladders, welding equipment, oxy-acetylene cutting equipment, files, hammer, pry and wrecking bars, transit, measuring tape, piano wire, carpenter's

	Sub-tasks	Enabling Objectives	Tools & Equipment
		knowledge of set-up of cranes, hydraulic jacking equipment, high lines or other rigging equipment knowledge of proper techniques and methods of establishing elevation points for sections or components	square, drawings, tool and material lists, compressor and air tools, electric panels for lighting, electric tools, hand lines, hydraulic jacking equipment, other rigging equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.06	Loads and transports sections or components to work site.	knowledge of cranes and a wide variety of rigging techniques and methods knowledge of signals knowledge of sequence of work ability to read and interpret drawings ability to read and follow construction schedules ability to operate hand tools and power equipment ability to lift and carry	crane(s), slings, shackles, hand lines, cribbing/dunnage, trucks, trailers, drawings and construction schedules

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.07	Hoists sections or components into position for fitting.	knowledge of methods and procedures for rigging and hoisting ability to give signals	crane(s)/high lines, slings, shackles, hand lines, Tirfors, chain block hoist, come-

	Sub-tasks	Enabling Objectives	Tools & Equipment
			alongs, spud wrenches, safety belts and lines, hydraulic jacking equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

44.08	Secures sections or components in rough fitting position.	knowledge of installation techniques knowledge of a wide variety of fitting methods and techniques ability to read and interpret drawings and specifications knowledge of erection of staging platforms ability to give signals ability to align components ability to weld ability to lift, climb and carry	welding equipment, oxy-acetylene cutting equipment, hand wrenches, socket wrenches, air impact gun, air compressor and hoses, hydraulic rams and jacks, Tirfors, screw jacks, come-alongs, chain block hoist, hand lines, spirit level, pry and/or wrecking bars, drift pins, spud wrenches, hammer, dogs and wedges

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

44.09	Detaches crane(s) or hoisting devices from sections or components.	knowledge of rigging signals ability to operate hand and power tools ability to lift, climb and carry	hand wrenches, socket wrenches, air impact gun, air compressor and hoses, hammer

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.10	Tack welds or bolts sections or components into final position.	knowledge of a wide variety of fitting techniques and methods ability to read and interpret drawings and specifications knowledge of welding code requirements in regard to welding and tacking sections or components ability to orientate, align and space sections or components ability to operate hand and power tools ability to lift, climb and carry	welding equipment, oxy-acetylene cutting equipment, piano wire, centre line equipment, transit, measuring tape, dogs and wedges, hammer, hydraulic jacks and rams, pry and wrecking bars, hand wrenches, drift pins, air compressor and hoses, air tools, i.e. chipping gun, electric panels boxes and electric tools, grinder, buffer, lighting, preheating torches, ladders, Tirfors, chain block hoist, come-alongs, screw jacks, arc-air gouger

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

44.11	Completes interior and exterior welding of sections or components.	knowledge of a wide variety of welding techniques and methods, such as root pass, fill pass and capping pass ability to read and interpret drawings and specifications knowledge of welding code requirements in regard to welding and tacking sections or components ability to operate hand and power tools ability to lift, climb and carry	welding equipment, preheating equipment, manual and automatic chipping guns, grinder, buffer arc-air gouger, air compressor and hoses, air ventilating equipment, protective breathing equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to perform such operations as preheating, back gouging, grinding, buffing, manual and automatic chipping ability to operate stick, wire feed and submerged-arc welding equipment	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.12	Tests completed welds to assure quality.	knowledge of welding codes and requirements pertaining to finished product knowledge of methods and techniques involved in repair of weld flows ability to use X-ray, mag-particle, dye penetrant methods and equipment	testing equipment, welding equipment, grinder, buffer, arc-air gouger, air compressor and hoses, preheating torches, breathing apparatus, ventilation equipment, manual and automatic chipping guns

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	no	no	yes	no	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.13	Fixes structure into permanent position.	knowledge of a wide variety of techniques and methods of affixing structures in permanent position ability to read and interpret drawings and specifications ability to operate hand and power tools	drawings, various types of wrenches, concrete pumping equipment, crane, slings, shackles

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to weld ability to lift, climb and carry	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.14	Removes unnecessary materials from structure.	knowledge of appropriate codes and requirements for finished interior surfaces knowledge of methods and techniques of rigging ability to operate oxy-acetylene cutting equipment, arc-air gouging machines and grinders ability to operate hand and power tools ability to weld ability to lift, climb and carry	drawings, oxy-acetylene cutting equipment, arc-air gouger, grinder, slings, shackles, crane, hand lines, air compressor and hoses, welding machine, come-alongs, chain block hoist, ladders, large and small hammers, pry and wrecking bars

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
44.15	Removes, repairs and maintains stacks, towers and furnaces.	knowledge of stacks, towers, furnaces and related equipment knowledge of use and purpose of hoisting and rigging devices knowledge of lifting, hoisting and rigging equipment set-up techniques knowledge of methods of handling large components	crane(s), slings, drawings, material and equipment lists, repair or dismantling schedules, cribbing, rigging belts, safety belts and harnesses, lanyards, wrenches, hand lines, pry and wrecking bars, chokers and shackles, come-

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of signals knowledge of material preparations. such as installing lifting lugs and removing protective coatings knowledge of installation techniques for erecting staging platforms knowledge of efficient disbursement of tools and equipment knowledge of preparation of pedestal bolts. if any knowledge of set-up of cranes. hydraulic jacking equipment. high lines or other rigging equipment knowledge of proper techniques and methods of establishing elevation points for sections or components knowledge of cranes and a wide variety of rigging techniques and methods knowledge of sequence of work knowledge of a wide variety of fitting methods and techniques knowledge of welding code requirements in regard to welding and tacking sections or components knowledge of appropriate codes and requirements for finished interior surfaces ability to read and interpret drawings and specifications, flowcharts and/or construction schedules, materials and tool lists as well as area maps	alongs. welding equipment. gloves. goggles. measuring tape. pen or pencil. paper. oxy-acetylene cutting equipment. air compressor and hoses. monorails. electric/air tuggers. chain block hoist. Tirfors. hydraulic jacks. shims. hammer. ball-peen hammer. dogs and wedges. staging planks and brackets. ladders. safety lines. extension cords, electric lighting. grinder. soapstone. air manifold. screwdrivers. Allen wrenches. pipe wrenches, impact wrenches, rigging equipment. spud and hand wrenches. jacking systems. cribbing. drift pins, piano wire, ventilation equipment, manual and automatic chipping guns, concrete pumping equipment, plasma arc cutting equipment, eye protection, gloves, personal safety equipment, breathing apparatus

Sub-tasks	Enabling Objectives	Tools & Equipment
	ability to lift, climb and carry	
	ability to follow manufacturers' recommendations	
	ability to place sections or components in order of removal	
	ability to operate a wide range of hand and power tools safely	
	ability to read and follow removal and maintenance schedules and techniques	
	ability to orientate, align and space sections or components	
	ability to perform such operations as preheating, back gouging, grinding, buffing, manual and automatic chipping	
	ability to use X-ray, mag-particle, dye penetrant methods and equipment	
	ability to operate oxy-acetylene cutting equipment, arc-air gouging machines and grinders	
	ability to operate plasma arc cutting machines	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	yes	yes	yes	yes	ND	ND

Task 45 **Off-loads, shelters and transports calandria.** (NOT COMMON CORE)

Trend: Specialized training is required for those working in the nuclear industry.

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.01	Receives calandria at special dock site.	knowledge of procedures knowledge of basic boilermaker skills ability to read and interpret drawings ability to secure barge to mooring ability to operate hand equipment ability to lower calandria onto special base under the water line to align it to the dock **(NOT COMMON CORE)**	chain block hoist, lashing

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.02	Prepares dock area for transportation.	knowledge of procedures ability to read and interpret drawings knowledge of basic boilermaker skills ability to match tracks to those on the barge ability to pull calandria off the barge onto the dock into temporary shelter ability to block calandria ability to operate hand and power tools ability to lift and carry	cutting torch (oxy-acetylene), pull devices, restraint equipment, track-laying equipment and tools, blocking materials (wood and steel)

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to remove railway tracks, if necessary, after transportation of calandria **(NOT COMMON CORE)**	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.03	Installs bellows on the reactor face.	knowledge of procedures ability to read and interpret drawings knowledge of basic boilermaker skills knowledge of welding procedures of exotic materials ability to weld **(NOT COMMON CORE)**	cleaners, welding machine, calibration equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.04	Transports calandria to the vault entrance.	knowledge of procedures knowledge of basic boilermaker skills knowledge of blocking techniques ability to raise and place calandria onto a multi-wheeled float and direct transportation	500 ton hydraulic jack, blocking materials, special commotio, multi-wheeled float

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to lift and carry (NOT COMMON CORE)	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.05	Places calandria on rail wheeled dollies.	knowledge of procedures knowledge of basic boilermaker skills knowledge of blocking techniques knowledge of track laying techniques ability to jack up calandria and remove the float and railway tracks under the calandria ability to lower the calandria onto rail-wheeled dollies and pull it to final location ability to lift and carry (NOT COMMON CORE)	500 ton hydraulic jack, blocking materials, pulling devices, restraint equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
45.06	Places calandria on its final location.	knowledge of procedures knowledge of basic boilermaker skills knowledge of blocking techniques	tendon hydraulic jacking rods, precision levelling equipment, rigging equipment

Sub-tasks	Enabling Objectives	Tools & Equipment
	knowledge of levelling techniques	
	knowledge of rigging techniques	
	knowledge of rigging signals	
	ability to hoist calandria to ceiling	
	ability to remove rails	
	ability to operate multiple tendon hydraulic jacking rods	
	ability to lift and carry	

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

Task 46 **Installs containment liner panels. (NOT COMMON CORE)**

Trend: Specialized training is required.

	Sub-tasks	Enabling Objectives	Tools & Equipment
46.01	Off-loads plate.	knowledge of procedures	crane, rigging equipment
		knowledge of basic boilermaker skills	
		knowledge of laydown area	
		knowledge of rigging techniques and equipment	
		ability to read and interpret drawings	

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to operate hand equipment (NOT COMMON CORE)	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

46.02	Transports plates to the plate liner shop.	knowledge of layout techniques knowledge of plate fitting techniques knowledge of plate welding techniques to reduce distortion knowledge of rigging practices ability to read and interpret drawings ability to weld ability to assemble material into gangs and walers (NOT COMMON CORE)	plate lifting devices, welding machine, crane, rigging equipment

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

46.03	Installs, fits and welds panels in final position.	knowledge of layout techniques knowledge of plate fitting techniques knowledge of plate welding techniques to reduce distortion knowledge of rigging practices	plate lifting devices, welding machine, crane, rigging equipment

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings ability to weld **(NOT COMMON CORE)**	

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
46.04	Tests all welds for quality.	knowledge of non-destructive testing techniques knowledge of vacuum test, dye penetrant test and/or X-ray test ability to perform tests ability to record and report test results **(NOT COMMON CORE)**	vacuum tester, X-ray equipment, dye penetrant materials, recording data catalogues

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	no	NV	no	no	no	no	no	no	no	ND	ND

Task 47 Installs fuel channels. (NOT COMMON CORE)

Trend: Specialized training is required.

	Sub-tasks	Enabling Objectives	Tools & Equipment
47.01	Identifies and practises use of all specialty equipment.	knowledge of basic boilermaker skills	protective clothing, micrometers, specifications, charts, procedural manuals

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to demonstrate good mechanical aptitude ability to attend training centre meetings ability to read, listen and communicate ability to follow safety and installation procedures ability to lift, carry and operate equipment	

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
47.02	Catalogues end fittings.	knowledge of quality control procedures ability to read and interpret drawings ability to determine bore size (inside diameter) and location of each end fitting in the reactor face ability to record data	recording data catalogues, micrometers, handling equipment for end fittings

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
47.03	Identifies and catalogues pressure tubes.	knowledge of quality control procedures	recording data catalogues,

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to read and interpret drawings ability to determine outside diameter and location of pressure tubes in the reactor ability to record data	micrometers, handling equipment for pressure tubes

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

47.04	Selects end fittings to match pressure tubes.	knowledge of proper use of electrical heat coils and related equipment knowledge of tube expanding and proper use of related equipment ability to determine which tubes have an interference fit ability to heat end fitting to slide over pressure tube ability to operate expanding and rolling tools	electrical heat treatment equipment, temperature monitoring equipment, special expanding tools, calibration measuring devices

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

47.05	Performs helium leak test on sealed joints.	knowledge of pressure test procedures ability to perform tests	gauges, pressure test equipment, record book

	Sub-tasks	Enabling Objectives	Tools & Equipment
		ability to record and report test results	

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	no	yes	yes	no	no	no	no	ND	ND

47.06	Installs pressure tube in calandria.	knowledge of techniques knowledge of special rigging for handling and inserting pressure tube in calandria tube (insertion carriage) ability to install tubes using special equipment and supports ability to follow directions	hoisting equipment and insertion carriage, calibration equipment

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

47.07	Installs end pressure tube fitting and bellows expansion joint.	ability to use electrical heat coils and related equipment properly ability to expand tube and to use related equipment properly knowledge of welding procedures for exotic metals	electrical heat treatment equipment, temperature monitoring equipment, special expanding tools, calibration measuring devices, welding machine

(NOT COMMON CORE)

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
47.08	Secures the completed fuel channel in calandria.	ability to read and interpret drawings ability to determine proper procedure and tolerances ability to install permanent hardware to secure fuel channel ability to follow directions ability to operate hand tools **(NOT COMMON CORE)**	special gauges and tools (wrenches), calibration measuring devices

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

	Sub-tasks	Enabling Objectives	Tools & Equipment
47.09	Performs helium leak test.	knowledge of pressure test procedures knowledge of standards for final assembly to confirm its integrity prior to loading with fuel and heavy water knowledge of quality control procedures ability to read and interpret drawings ability to interpret and execute final check list ability to record data **(NOT COMMON CORE)**	gauges, pressure test equipment, data recording material

NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK
yes	yes	NV	yes	yes	yes	no	no	no	no	ND	ND

APPENDICES

APPENDIX "A"

TOOLS AND EQUIPMENT

The working environment of the boilermaker can be very hazardous. Safety is a shared responsibility with implications for management and labour as well as for government, which enforces safe working practices. Boilermakers generally supply their own boots, coveralls and gloves. Items, such as hard hats, eye, ear and lung protection and all other tools and equipment are usually the responsibility of the employer.

The basic hand tools and equipment, some of the power tools and equipment, and the safety equipment listed below are usually made available on the work site. Resource materials, drawings, manufacturers' manuals and log books are normally supplied by management.

Welding Equipment

amperages (with remote control)
chipping hammer
dye penetrant testing equipment
electrode holders and whips
electrode ovens/portable
FCAW equipment
fireproof blankets
GMAW equipment
ground clamps and cables
GTAW equipment
inspection mirror
leather mitts and gloves
leather protective clothing
leather welding shield
lenses (filtered and clear)
paint metal markerpanel board and cable
penlight and batteries
personal clear safety glasses pouch
power sources with welding cable and "y's"
purge paper
rod dispenser and rod pouch
SMAW equipment
steel letter and number stamps
stick electrodes
stud welding equipment
suitable respirator
welding shield c/w hard hat
wire brush

Oxy-fuel Equipment

air arc
burning goggles
cylinder buggies c/w fire extinguishers
cylinder hoses and repair kits
cylinder hoses and wrenches
cylinder torches (combination heavy duty and heating)
friction lighters (strikers)
leather gloves
machine torch (radiographs)
oxy-fuel cylinders
oxy-fuel welding rod
plasma arc cutting equipment
regulators, adapters, washers and cylinder manifolds
spare burning lenses c/w washers
tip cleaners and drills
tips (cutting, scarfing, welding and heating)

Rigging Equipment

- beam clamps
- beam trollies
- chain block hoists
- chain slings
- come-alongs
- eyes, rings and bolts
- fibre rope
- hard hat
- hooks
- hydraulic jacking system
- leather gloves
- links, swivels and rings
- marline spike
- plate clamps
- rigging belt c/w tools, safety belt and lanyard
- shacklessnatch blocks
- spreader and equalizer
- synthetic web slings
- tackle blocks
- Tirfors
- turnbuckles
- utility hoists (tuggers)
- wire mesh slings
- wire rope
- wire rope blocks
- wire rope clips
- wire rope cutters
- wire rope slings

Tube Removal and Expansion Equipment

- adapter sleeves
- air drills
- air motor and adapter sleeve
- beading tools
- belling and flaring tools
- chipping guns
- collapsing tools and chisels
- compound tube gauges
- condenser and boiler tubes
- cutoff saw
- drills and bits
- expanders for exchanger
- extensions
- grinders
- hydraulic tube pullers
- internal dial callipers
- internal tube cutter
- magnetic drill press
- micrometers
- parallel gear drives
- peening tools
- pipe and tube benders (hydraulic)
- plate nibblers
- pneumatic scalers and chisels
- power threading machine and dies
- ratchet wrenchesreciprocating air saw and blades
- right angle drives
- rivet guns and rivets
- rotary hammer and bits
- screw-gun
- seal weld remover
- serrating tools
- spiral and twist brushes
- torque controlled rolling motors
- tube drifts
- tube end facers
- tube guider
- tube hole reamers
- tube milling machine
- tube rolling lubricant
- tube ways reducer
- universal joints

Hand Tools and Miscellaneous

adjustable wrenches
air compressor
air hose
air hose filters
air hose oilers
air hose regulators
air hose repair kit
air manifolds
air mover
Allen wrenches
bolt cutters
chain wrenches
chisels
clamps
copper tube benders
copper tube cutters and flaring tool
dolly bars
electric lighting
electrical taps
extension cords
felt pens
files
flashlight and batteries
funny bars
hacksaw
hammers
hand rivet gunhydraulic pumps and jacks
levels
light bulbs
lock-out tags
lumber crayon
pipe vice (grip chain type)
pliers
quartz halogen lights
screw jacks
screwdrivers
slug wrenches
soapstone and holders
socket and ratchet sets
structural offset wrenches, pipe wrenches
stud and screw extractors
tap and die sets
tap extractors
thread pitch gauge
torque wrenches
utility knife
vice grips
wire #9

Measuring and Layout Tools

callipers
chalk lines
dividers
engineer's level
folding rules
micrometers
piano wire
plumb bob
punches
scribes
squares
steel tapes
trammel point
transit
water level

GLOSSARY

A-frame	a portable structure used to support lines and lifting devices in order to hoist loads.
API	American Petroleum Institute.
appurtenances	components or apparatus belonging to something larger or more important.
ASME	American Society of Mechanical Engineers.
AWWA	American Water Works Association.
boom	the main member used to carry the hoisting tackle on a crane.
boom angle	the angle between the centre line of the boom and the horizontal while the boom is under load.
boom pendant	a fixed-length rope supporting the boom.
choker	sling, wire rope with eyes spliced on each end, used to lift load.
counterweight	weight added to the upper structure of a crane to increase its stability; turns with the crane.
CSA	Canadian Standards Association.
derrick	a structure used to support lifting or hoisting equipment such as tower cranes.
drop block	term used to describe the lift hook or other assembly at the end of the hoist line of a crane.
dunnage	wood blocking or other material used to temporarily stabilize or support equipment, cranes or components.
falls	a set of blocks reeved or laced, with cable or rope.
FD	forced draft fan.

gantry	a frame forming part of the upper-structure of a crane to which the boom suspension ropes are attached. see also A-frame.
gross capacity	the maximum load for a crane based on its design characteristics and load chart.
GTAW	gas tungsten arc welding.
headache block	the travel block of the multiple or main load line.
hook block	an assembly incorporating a single or multiple sheave and a heavy duty steel hook.
hydraulic boom	a type of crane boom manipulated by hydraulics.
hydrostatic pressure	pressure exerted by a column of fluid.
ID	induced draft fan.
jib	an extension to the boom mounted at the boom tip to provide added boom length.
jib or whip line	the single load line.
jumping a derrick	the process of progressively raising a derrick or crane tower as a structure being built increases in height.
laced blocks	passing cable through a set of blocks by starting from an outside sheave and following in rotation; will usually tilt travel block when running empty.
lattice boom	a type of framework crane boom, usually manipulated wire rope mechanisms.
lay-up	the term used to describe the fabrication or repair of fibreglass components.
load chart	specifies the maximum gross capacity of the hoist or crane.
luff	using two or more sets of falls, by attaching to the lead line of the first set of falls another set, to give greater pulling power.
MIG, TIG	metal inert gas, and tungsten inert gas welding - obsolete terms that have been replaced with GMAW - gas metal arc welding, and GTAW - gas tungsten arc welding.
MSDS	Material Data Safety Sheets.

outriggers	extendable arms attached to a crane base mounting which rest on supports at the outer ends and provide a means of relieving the crane weight from the carrier.
parts of line	the number of parts or individual ropes in a hoist line.
pettibone	a type of small crane.
pneumatic	refers to any piece of equipment which uses gas or air as its source of energy.
reeved blocks	passing cable or rope through a set of blocks, as opposed to laced blocks and in such a manner so that there are no lines crossed or rubbing each other.
reeving	the act of attaching a rope to a number of sheaves in order to gain the maximum mechanical advantage; a rope system in which the rope travels around drums and sheaves.
rope	refers to wire rope unless otherwise specified.
sheave	a wheel or pulley grooved for a given diameter of rope and used to change the direction of a running rope.
SMAW	shielded metal arc welding.
sniffing	using testing equipment to check air quality.
splice	the joining of the ends of two ropes by weaving the strands of one over and under the strands of the other.
spreader bar	beam used for hoisting flimsy trusses or long flimsy loads; also used to equalize the weight and to keep the load, such as tank plate, from buckling.
spreaders	a set of chokers or slings of equal length used to lift a load.
stress relieved	a process of heating a fabricated piece of equipment to a high temperature to relieve any stress caused from welding the metal together.
tag line	a length of rope used to guide a load, being lifted, into a desired position.
vessel	any one of many kinds of tanks or hollow components designed to contain liquids, gases, or solids.

WCB	Workers' Compensation Board.
WHMIS	Workplace Hazardous Materials Information System.
weir box	an open top chamber used inside of vessels to collect liquids.

PERCENTAGE RATINGS

BLOCK A SAFETY, ACCIDENT PREVENTION AND FIRST AID

Task 1	Follows safety laws and regulations.
Task 2	Selects personal protective equipment.
Task 3	Applies safe work practices.
Task 4	Heeds safety and warning systems.
Task 5	Selects and operates fire fighting equipment.
Task 6	Performs housekeeping procedures.

BLOCK B JOB PLANNING AND PREPARATION

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	15	NV	10	3	3	5	10	10	8	ND	ND	8%

Task 7 Reads drawings and specifications.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	20	NV	50	34	22	30	30	40	65	ND	ND	35%

Task 8 Plans the job for removal, maintenance and/or repair.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	30	NV	30	33	56	50	60	50	20	ND	ND	38%

Task 9 Practises good communication skills.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	60	50	NV	20	33	22	20	10	10	15	ND	ND	27%

BLOCK C FABRICATION, REPAIR/MAINTENANCE, ASSEMBLY/DISASSEMBLY AND DEMOLITION OF COMPONENTS AND STRUCTURES

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	35	35	NV	43	41	38	40	50	30	32	ND	ND	39%

Task 10 Operates gas cutting equipment.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	5	NV	5	14	8	10	8	5	10	ND	ND	8%

Task 11 Welds metal.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	50	25	NV	25	27	46	25	0	5	32	ND	ND	26%

Task 12 Prepares plate steel for fabrication of steel vessels.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	5	NV	2	11	11	8	6	10	5	ND	ND	8%

Task 13 Lays out circular shell for internals and appurtenances.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	5	NV	7	18	4	6	0	10	8	ND	ND	7%

Task 14 Assembles/disassembles, repairs and maintains tanks, hoppers and similar vessels.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	35	NV	35	19	11	20	60	30	15	ND	ND	26%

Task 15 Performs stress relieving activities for vessels.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	2	NV	1	3	2	3	0	2	2	ND	ND	2%

Task 16 Fabricates and assembles components.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	10	NV	20	3	8	20	20	30	18	ND	ND	15%

Task 17 Performs informal inspections of completed weldments.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	2	NV	1	1	0	2	0	3	5	ND	ND	2%

Task 18 Prepares vessels and performs tests.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	3	NV	2	2	2	4	4	4	2	ND	ND	3%

Task 19 Performs lay-up, removal and repair of fibreglass components.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	8	NV	2	2	8	2	2	1	3	ND	ND	3%

BLOCK D **RIGGING AND HOISTING**

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	20	NV	15	12	20	15	20	30	20	ND	ND	19%

Task 20 Fabricates and prepares rigging and hoisting apparatus.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	5	NV	10	20	3	13	10	5	15	ND	ND	9%

Task 21 Erects scaffolds and other working platforms.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	7	NV	6	10	3	15	3	6	8	ND	ND	7%

Task 22 Dismantles scaffolds and working platforms.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	NV	6	10	3	8	3	5	8	ND	ND	6%

Task 23 Hangs swing stages from structures.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	5	NV	4	5	3	14	3	5	3	ND	ND	5%

Task 24 Uses ropes, slings and hoists for rigging loads.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	20	20	NV	20	5	6	5	15	40	25	ND	ND	16%

Task 25 Assembles and disassembles guy derricks, stationary cranes, gin poles, monorail systems, tower cranes, jacking systems and other hoisting equipment.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	20	NV	10	5	28	10	15	10	4	ND	ND	11%

Task 26 Determines load weights.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	2	NV	2	5	2	3	1	5	1	ND	ND	3%

Task 27 Determines rigging requirements.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	2	3	NV	4	5	2	5	1	5	5	ND	ND	4%

Task 28 Selects cranes/hoisting equipment with the capability to do the job.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	3	NV	2	5	2	5	1	3	1	ND	ND	3%

Task 29 Ensures site preparedness.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	5	NV	4	5	6	3	1	1	3	ND	ND	4%

Task 30 Identifies signaller.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	15	5	NV	2	5	2	3	1	1	1	ND	ND	4%

Task 31 Prepares cranes for transport.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	NV	2	5	10	3	1	2	3	ND	ND	4%

Task 32 Assembles hydraulic and lattice boom cranes.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	NV	4	5	10	5	20	5	9	ND	ND	8%

Task 33 Disassembles hydraulic and lattice boom cranes.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	5	NV	4	5	10	5	20	5	9	ND	ND	8%

Task 34 Assembles and disassembles specialty equipment and attachments.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	15	5	NV	20	5	10	3	5	2	5	ND	ND	8%

BLOCK E RECEPTION, PREPARATION, INSTALLATION, REMOVAL, REPAIR AND MAINTENANCE OF FABRICATED COMPONENTS

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	35	30	NV	32	44	38	40	20	30	40	ND	ND	34%

Task 35 Inspects vessels, components and equipment for defects or damage.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	1	NV	1	1	3	4	2	2	2	ND	ND	3%

Task 36 Prepares for installation, repair or maintenance.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	7	NV	4	1	3	6	4	5	5	ND	ND	5%

Task 37 Installs, repairs, maintains, removes and demolishes penstock sections.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	1	NV	4	10	17	2	1	1	6	ND	ND	6%

Task 38 Installs, removes, repairs and maintains appurtenances in vertical processing vessels.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	17	NV	15	11	6	6	2	15	8	ND	ND	9%

Task 39 Installs, repairs/maintains, assembles/disassembles and tests tube bundles.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	6	NV	10	10	6	6	1	15	10	ND	ND	8%

Task 40 Installs, removes and expands tubes in boilers, heat exchangers and related equipment.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	10	NV	20	20	6	7	5	15	7	ND	ND	10%

Task 41 Installs, repairs/maintains, assembles/disassembles and demolishes component parts of boilers.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	10	25	NV	30	20	6	45	72	17	35	ND	ND	28%

Task 42 Installs, repairs/maintains, assembles/disassembles and demolishes bottom supported boilers.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	10	NV	5	8	9	5	1	15	5	ND	ND	7%

Task 43 Receives, prepares, repairs/maintains, assembles/disassembles, demolishes, stores and installs precipitator components.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	12	NV	3	8	13	13	2	5	20	ND	ND	9%

Task 44 Prepares/fabricates, repairs/maintains, assembles/disassembles, demolishes and installs stacks, towers and furnaces.

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	15	10	NV	3	8	13	6	10	10	2	ND	ND	9%

Task 45 Off-loads, shelters and transports calandria.
(NOT COMMON CORE)

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	0	NV	2	1	6	0	0	0	0	ND	ND	2%

Task 46 Installs containment liner panels.
(NOT COMMON CORE)

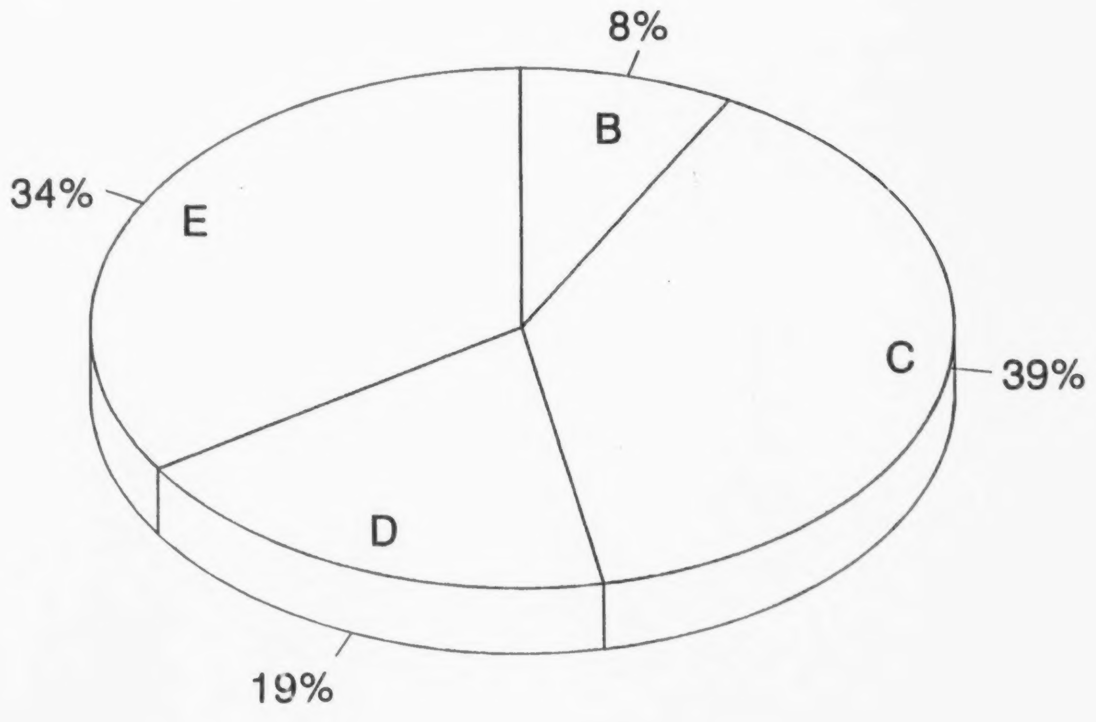
%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	0	NV	2	1	6	0	0	0	0	ND	ND	2%

Task 47 Installs fuel channels. **(NOT COMMON CORE)**

%	NF	NS	PE	NB	PQ	ON	MA	SK	AB	BC	NT	YK	Nat. Avg.
	5	1	NV	1	1	6	0	0	0	0	ND	ND	2%

BLOCK PERCENTAGES*

Boilermaker



* The average time a worker spends performing each block in a given year in relation to other blocks of the analysis, taking into consideration the complexity (importance plus difficulty) of the block.

BLOCK PERCENTAGES

A **SAFETY, ACCIDENT PREVENTION AND FIRST AID ****

B **JOB PLANNING AND PREPARATION**

C **FABRICATION, REPAIR/MAINTENANCE, ASSEMBLY/DISASSEMBLY AND DEMOLITION OF COMPONENTS AND STRUCTURES**

D **RIGGING AND HOISTING**

E **RECEPTION, PREPARATION, INSTALLATION, REMOVAL, REPAIR AND MAINTENANCE OF FABRICATED COMPONENTS**

**Since safety practices are a mandatory feature of all occupations, they are considered common core. Ratings, therefore, are not required for Block A.